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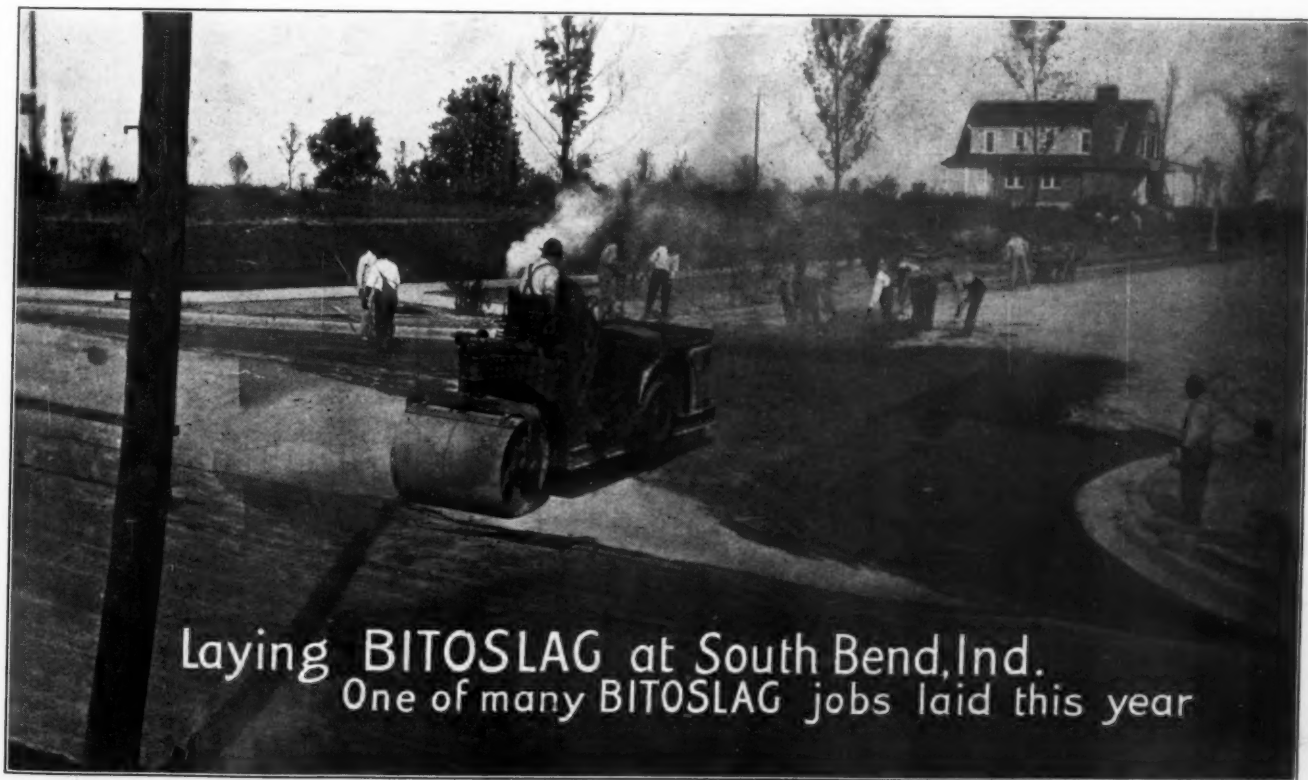
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# Municipal Journal

Volume XLIII

NEW YORK, OCTOBER 4, 1917

No. 14

## STREET PLANNING AND CONSTRUCTION IN BEXLEY

**Care in Selecting and Enforcing Proper Specifications Secures Good Results—Bituminous Pavements of Various Kinds—Concrete Pavement with Integral Curb—Rounded Brick Gutters—Comparative Costs of Different Pavements.**

By CHARLES CARROLL BROWN.

Bexley, Ohio, is a village inhabited mainly by business and professional people belonging to Columbus, and adjoins that city. It is rather sharply divided into two sections by the street on which is located the principal car line connecting the two municipalities. The section on one side of this street, comprising the larger part of the village area, contains the population which is in easy circumstances, or is wealthy, and is in general able to pay for what it wants; while those on the other side of this street, although in large part owners of the property in which they live, must exercise great care in their expenditures and must often choose the less attractive pavement because it is all they can afford to pay for.

The village board is progressive and public spirited and has made public improvements for the benefit of the village and its inhabitants and with a view to the whole village as well as to the individual street. The engineers engaged in the development from the start in 1915 have been the Jennings-Lawrence Company, of

being of sheet asphalt and of asphaltic concrete, Topeka specification. One street is of tar concrete, Topeka under a special Tarvia specification. Most of the streets are of standard construction and require no special description, but some special details have been worked out which will be of interest. A comparison of the cost of the various kinds of construction is also available, as well as a comparison of the cost of the same kind of pavement in each of the past three years. One element in the success of the streets has been the selection of competent contractors for the work, who have done their work well. This, with close inspection by the engineers of both materials and workmanship, as well as the working out of details to fit the conditions of the particular spot, has produced a result which is highly satisfactory.

The character of asphalt construction, sheet asphalt specification, is indicated by the first of the accompanying photographs. The 5-inch stone curb, 6-inch concrete foundation and 3-foot brick gutter will be noted.



FIG. 1—SHEET ASPHALT WITH THREE-FOOT BRICK GUTTERS.

Columbus, and this has helped to unify the work of the municipality.

In selecting the material for the street surfaces, the decision was made in favor of bituminous surfaces, and they have been used exclusively on the northern side of the dividing street, asphalt being used on all streets but one. The dividing street with the street car line is paved with brick and was built under the state highway laws and not by the village. One street on the southern side is of reinforced concrete, the decision for it being based largely on the lower cost of the construction. The asphalt streets are mainly bitulithic, one or two streets

They form one set of standard details. Another set will be described later in detail. Trinidad or Bermudez asphalt was used in all asphalt construction.

The most popular pavement in the village is bitulithic. A newly completed street is shown in the second photograph. The method of constructing curb and gutter is of interest. The straight curb and gutter is of concrete, the gutter being 18 inches wide. The face of the curb is sloped and curved so as to form a rounded profile in cross section, which is an approach to the general form of the special gutter design described more fully below. This gives a very pleasing appearance to



FIG. 2—VERTICAL CURB AT INLET JOINING GUTTER SLOPE AT CORNER.

the gutter and conceals any deflections from a straight line in the face of the gutter, which are so common in concrete curb construction. The apparent irregularity in the curb seen in the photograph is not real, but the appearance is caused by the filling material behind the curb concealing the black line, by dirt in the gutter, and by the shadows crossing the line. The radii of the corners at street intersections are ample for good appearance and for convenience of traffic. The brick gutter with curved cross section is used, somewhat flattened so as to interfere as little as possible with traffic. Where the sidewalk crosses the curb the gutter is brought up as much as possible without interfering with the drainage, and the curb is made of concrete with vertical face. While the inlets for storm water are usually at about the middle point of the curve, they can be placed at the



FIG. 3—BRICK GUTTER AT CURB INLET.

end of the vertical face, so that the water will not flow across the path of the pedestrian if of sufficient quantity to interfere with his progress. This vertical-face curb is finished at the near end (in the photograph) so as to join with the brick gutter around the curve at the corner, which, as shown, requires no curb.

Fig. 3 shows the construction of the curb at the inlet for storm water. The brick surface of the gutter and the concrete surface of the inlet structure are clearly distinguishable in the photograph.

On streets of the most recent construction the rounded brick gutter which requires no curb has generally been used. It is seen under construction in Fig. 4, and the cross section is shown in Fig. 5. In the background the forms have been placed on top of the 4-inch concrete base previously placed. This foundation extends 1½ inches below the foundation of the pavement, except for brick and macadam construction, in which it coincides with the pavement foundation. In the middle ground the 1-inch mortar has been placed, and in the foreground the brick pavement has been placed and in part grouted and covered for setting of cement. The standard construction lays five rows of brick lengthwise in the bottom of the gutter and a row each side transversely. With the grout filler, this makes a monolithic

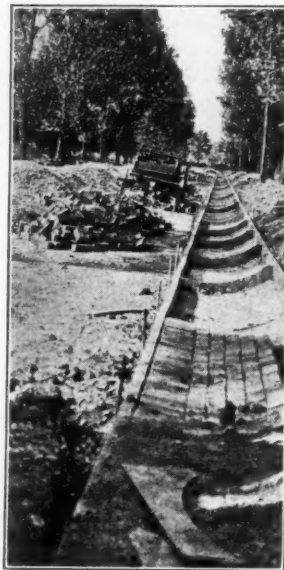


FIG. 4—CONSTRUCTING CURVED BRICK GUTTER.

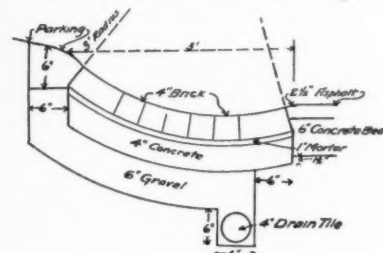


FIG. 5—SECTION OF CURVED BRICK GUTTER.

construction which thus far shows no signs of separation of the bricks individually, even where the hauling of house building material over it for a number of days

had full opportunity to crush the upper edge or knock the bricks loose. Consequently, the construction is not changed where driveways are put in across the sidewalks, except to lower the back of the construction

a little to ease off the passage of wheels across the drop in the gutter. The construction is quite as flexible in this way as concrete, and property owners can have their driveways made to suit them, provided they do not break the cement sidewalk surface too much.

The construction of the street on which the Topeka specification asphaltic macadam was used was better than usual. No segregation of large stones in some areas, with too fine stone in others, was observed, and the pavement had almost as good appearance as the bitulithic streets. The engineers recognize the exceptional character of the construction they have secured and the greater certainty of good results with the more scientifically designed bitulithic pavement.

The standard specifications, on which all bids are received, provide for standard sheet asphalt, standard bitulithic, sarcolithic mineral rubber, asphaltic concrete, using Topeka mixture, bituminous concrete with Tarvia X, using Topeka mixture, and penetration method macadam. One street has been constructed using Tarvia, but with the specifications somewhat different from the



standard printed. The requirements for this street are clean  $\frac{3}{4}$  to  $1\frac{1}{4}$ -inch broken stone heated to a point between 120 and 200 degrees F. and thoroughly mixed with 20 gallons per cubic yard of Tarvia X heated to a point between 200 and 250 degrees F. The mixture is spread while warm  $2\frac{1}{2}$  inches thick on the base and rolled to thickness of 2 inches. A surface coat of one-half gallon of Tarvia, heated to 200-250 degrees, is covered with screenings or sharp sand and rolled until compacted, enough screenings or sand being left on the surface to protect the road while it is setting up. A hot mixer was used, and the processes of mixing and spreading are shown in Fig. 6. The principal difficulty with the construction was in the lack of capacity of the mixer, which made the work slow. It was apparently impossible to make the mixtures uniform, and the segregation of sizes is apparent on the surface in some places. Fig. 7 shows the compacted course of material before the surface was covered with the surface coat. This photograph shows none of the segregation of sizes mentioned. The finished pavement is shown in Fig. 8, which shows also the rounded brick gutter.

The concrete pavement on Pleasant Ridge avenue was constructed on the plan shown in the accompanying cross section of the street. It will be noted that the bottom line of the concrete is horizontal and that the crown in the upper surface is made by using a thickness of 6 inches



FIG. 6—MIXING AND LAYING SPECIAL TAR CONCRETE.

at the gutter and 8 inches at the center of the street. The curb is integral with the pavement and the reinforcement used in the pavement is turned up at the ends and extended through the curb, thus locking curb and pavement closely together. The wire mesh reinforcement is located 2 inches from the outer surface of the concrete. The triangular mesh reinforcement used was sufficient, so far as strength was concerned, but the sheets of metal were not stiff enough to keep their shape when put in place, and so there was trouble in keeping them exactly in position during the process of placing the concrete. Expanded metal or the trussed concrete mesh are more satisfactory in handling on the job on this account. Fig. 10 shows the nature of the surface finish, the construction of an expansion joint through pavement and curb, reinforced with steel protection plates, trussed concrete design. The ample radius of curb corners is shown also. The surface of the pavement is excellent throughout, the only defect being that at some of the joints the pavement is slightly above the remainder of the surface, so that in riding over it there is a noticeable waviness in the running. This may have been because the templet used sagged somewhat in the center, since the effect is more noticeable in the middle of the street. Or it may have been because the amount of concrete was slightly too small and the finishing process lowered the surface between joints, at which lines it

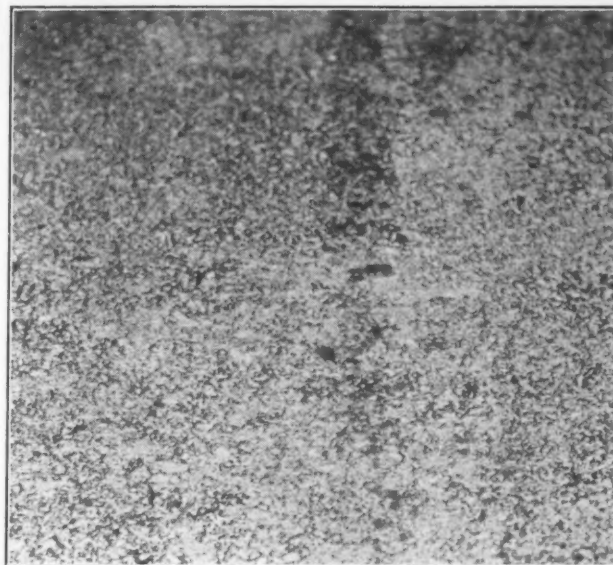


FIG. 7—COMPACTED TAR CONCRETE WITHOUT SURFACE COAT.

would naturally be brought up to full height to meet the tops of the reinforcing plates. This effect was much less than in an Iowa pavement which the writer observed, where the high joints were so numerous that it was practically impossible to drive an automobile comfortably or even safely at more than 10 miles an hour.

The street car company was not required by the terms of its franchise to pave between its tracks, and in one case the pavement was laid at the expense of the property owners. On one street the company agreed to pay the cost of a macadam pavement between the rails and one foot outside the single track, the macadam to be treated with glutrin. This work was done last year, and the tracks are everywhere easy to cross by traffic. The traffic is light and the pavement so good that the traffic does not touch the track area except to cross. Brick is laid at all street intersections, where the tracks are crossed regularly. The sinking of tracks in these brick intersections is the one blot on the excellent paving of the village. Every intersection shows some settlement after one or two years of use, and some of them are already in condition to make crossing by automobiles faster than a walk very uncomfortable.

#### INSPECTIONS AND REPORTS.

The inspectors on the work were required to make detailed reports each day. The regular daily samples required by Warren Brothers Company were taken of all



FIG. 8—FINISHED TAR CONCRETE PAVEMENT.

bitulithic construction and sent to that company's laboratory for analysis. The location from which every such sample is taken is recorded on a plat, with exact measurements of location and full statement of the mixture and amount of each ingredient and size of stone used, weights, etc.

A report was made of each block of concrete pavement laid, between expansion joints, on a form from which the following sample entries are made to show the care with which the work was done and the control of mixtures. The data will serve also to compare results and possibly to locate the reasons for any defect in the pavement which may develop during use. For convenience

date are made on a regular form 7½ by 14 inches, on which appear columns with the list of items in the standard specifications, blank for Quantity Completed, blank for Unit Price, and blank for Total Due on each item. At the bottom are given blanks for Total to Date; Total of Previous Estimates; Amount of This Estimate (difference); 10 Per Cent. of This Estimate; and Amount Due (difference).

Approved for payment by village council (date).

Correct (signed by resident engineer, village engineers, village clerk).

Bids were received for all the work of the season of 1915 on one day in June, and the prices at which the work

#### Data Kept Concerning Concrete Pavement Construction.

Number of section.....	2	13	16	17	18	19
Date, August.....	2	8	10	10	10	11
Length.....	40	32	32	32	32	36
Area (to be computed).						
Cubic yards (to be computed).						
Sacks of cement required.....	152	121	122	122	122	137
Sacks of cement actually used.....	128	129	134	124	120	137
Per cent. of error (to be computed).						
Sacks of hydrated lime used.....	30	10	12	12	11	12
Average daily temperature.....	95	80	95	95	95	80
Time required for initial set, hours.....	4	5	4	3½	4	5

#### REMARKS.

No. 2. Curb was all poured from 2 to 3 hours after base was in; that is, curb was completed in that time.

No. 13. Rained on section from 8 till 11 a. m. One 10-foot drive in this section.

No. 16. Weather fair.

Nos. 16, 17, 18. "Beat this if you can."

No. 19. Rained hard on this section. Refloated a part of it. Left some go just as it was.

in printing, the data for each slab or section are arranged in the table in vertical lines.

The form for the report on the concrete pavements was devised by Orin C. Stout, general manager for the Jennings-Lawrence Co.

Contractors' estimates of work done at a settlement

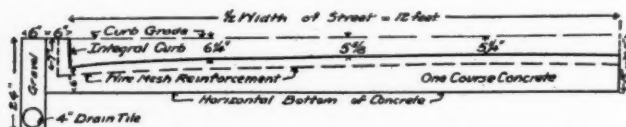


FIG. 9—HALF SECTION OF CONCRETE ROADWAY.



FIG. 10—CONCRETE PAVEMENT, WITH INTEGRAL CURB AND EXPANSION JOINT.

was let (not always to the lowest bidder) are excellent for comparing the cost of the various kinds of pavement used, since all the streets were newly laid out, all were of the same general character and had the same kinds and amounts of work to be done, had the same easy grades and treatment of drainage on surface and in storm water drains. A good comparison of costs can therefore be made.

For the pavement proper, complete on a 6-inch concrete foundation, the prices were as follows:

Brick, Barthmon & Knight, contractors.....	\$1.65
Sheet asphalt, W. M. Graham & Kinnear, contractors.	1.80
Bitulithic, Cleveland-Trinidad Paving Co., contractors.	1.85
Asphaltic concrete, Topeka form, Barthmon & Knight, contractors.....	1.48
Bituminous concrete, Tarvia special, McGary & Sparks, contractors.....	1.55
Concrete, Barthmon & Knight, contractors.....	.90

Of the other work involved, the prices were quite uniform, as follows, in the same order as the above:

Grading: Cents per cubic yard, 45, 40, 45, 40, 49, 45.	
Curb: Straight, per linear foot, 50, 45, 55, 50, 55, 40 (integral); circle, per linear foot, \$1, 90, \$1, 90, \$1, 40 (integral); redressed, per linear foot, —, 15, 10, —, 20, —; reset, per linear foot, —, 20, 10, —, 15, —; edging, per linear foot, 15, 20, 17, 20, 8, 15.	
3-foot brick gutter: 4-inch base, —, 60, 60, 55, 67, —; curved, 6-inch base, —, 70, 70, —, 75, —; curved, 4-inch base, —, 65, 65, —, 70, —.	
Catch-basins, each: \$35, \$35, \$35, \$30, \$30, \$35.	
Manholes, each: \$25, \$40, \$30, \$30, \$25, \$25.	
12-inch pipe sewer, per linear foot, 60, 70, 65, 50, 55, 65.	
15-inch pipe sewer, per linear foot, 80, 80, 82, 70, 75, 80.	
18-inch pipe sewer, per linear foot, \$1.10, \$1, \$1, 90, 85, \$1.	
20-inch pipe sewer, per linear foot, \$1.15, \$1.30, \$1.30, \$1.30, \$1.15, \$1.25.	
24-inch pipe sewer, per linear foot, —, \$1.80, \$1.75, —, \$1.45, \$1.45.	
4-inch drain, cents per linear foot, 7, 6, 6, 7, 7, 7.	

The majority of the pavements constructed being bitulithic, it is evident that in 1915 the cost of the pavement had little to do with the choice made of material to be used.



## THE USE OF COPPER SULPHATE

### Suggestions Concerning Its Application to Reservoirs to Destroy Algae—Prompt Application Desirable—Relation to Destruction of Fish.

In a paper before the New England Water Works Association entitled "Control of Microscopic Organisms in Water Supplies," William Haine, of the Newlands Sanitary Laboratory, after briefly discussing the trouble given by such organisms and the origin of the use of copper sulphate in combating it, gave the following suggestions for the use of this material and opinions concerning its effect on fish.

The treatment . . . consists essentially of placing weighed quantities of copper sulphate in loosely woven bags and dragging them from the stern of a motorboat. This is preferable to a rowboat, since the movement of the propeller assists materially in spreading the chemical evenly over the surface of the water.

While the services of a technically trained man are not necessarily required for this phase of the work, it is essential that some judgment be used in determining the rate of solution from the bags and controlling the amounts of chemical dissolved in the various parts of the reservoir in order to get the best distribution. It has been the writer's experience that better results are obtained if slightly larger quantities of the chemical are added to the shallow areas, as the heaviest growths are most frequently found in these localities.

As the amount of chemical required for successful treatment of a supply depends in a large measure upon the types of organisms present, it is necessary to know what types we are dealing with, since some of them are more susceptible to the action of copper sulphate than others. We have found that most uniformly successful results are obtained when the amount of chemical is determined on the basis of the most resistant types of odor-producing organisms in the supply. If the dosage is insufficient to kill the more resistant forms, secondary growths develop which also produce trouble. Scientific studies of the amount of copper sulphate necessary for killing various organisms may be found in the literature on this subject and the results of practical treatment coincide with the figures thus recorded.

In this connection, the most common mistake of the water works man is to defer action until the growths have developed to such an extent that the consumers object. The treatment produces best results when used as a preventive measure rather than as a cure, therefore it is highly advisable to treat promptly at the first sign of a decided increase of odor-producing algae. This information can be obtained only by microscopic examinations made at regular intervals, especially during the time when trouble is to be expected. In this way, the odor-producing organisms are detected at their first appearance and prompt treatment destroys them before the consumers are aware of any possible difficulty. Although the method is undoubtedly efficient under proper control, it cannot be emphasized too strongly that a definite knowledge of the condition of the reservoir is always required if uniformly successful results are to be obtained.

In some instances, subsequent to the treatment of a supply, large numbers of fish have died, and for this reason numerous researches have been carried out to determine the tolerance of various types of fish to copper sulphate. It has been shown that trout can be killed with .14 parts per million of copper sulphate, while black bass are able to withstand up to 2.10 parts per million, and other species range between these limits. A phase

of the problem that has not been emphasized, however, is the effect of the reduction of the dissolved oxygen in the water following copper sulphate treatment. Laboratory tests of water after treatment show a material reduction in the numbers and types of algae with rapid increases in the numbers of bacteria, and accompanying these changes the dissolved oxygen in the water is very materially reduced. This change is due to the bacterial activity involving the oxidation of decomposing algae growths. Our records covering a great many copper sulphate treatments show that there has been no destruction of fish life in the cases where the treatment was given before the growths had developed to any great extent. In many cases the amount of copper sulphate used was greater than that given in the literature as sufficient to kill certain types of fish which were present.

There are numerous records to show that great numbers of fish have been killed as a result of the sudden reduction of the dissolved oxygen content of reservoirs and lakes, following the destruction of heavy growths of algae by marked changes in weather conditions. This trouble was experienced by one of our Connecticut cities during May of this year, and twelve barrels of fish were taken from the supply. Another instance was reported in Flushing, New York, where 200 carp and a number of perch were killed in lake Kissena. Sensational reports were circulated to the effect that the fish had been poisoned, but an investigation conducted by a chemist of the New York Water Department brought out the fact that the death of the fish was due, not to any poisonous foreign substance in the water, but rather to a lack of oxygen. Similar conditions have been reported in Massachusetts, New Jersey, and in other states, where copper sulphate had not been used. In the writer's opinion, many instances where large numbers of fish have been killed following copper sulphate treatment, the difficulty has been due to the sudden destruction of large volumes of vegetable growths rather than to any direct poisonous effects of the chemical.

It has been asserted that anything which would destroy fish would be harmful to man, and there are some who object to the treatment on these grounds. Authorities are agreed, however, that copper sulphate as it is ordinarily applied in ridding supplies of microscopic organisms does not endanger public health. The fact that many cities throughout the country have been getting relief for a number of years by the use of the treatment without any evident adverse effects is a good indication that the method is not a dangerous one and merits the attention of any municipality where objectionable types of algae exist in the water supply.

### EXCAVATING IN SHALLOW CUT.

In the double tracking of a street railway through the village of Milford, Connecticut, in connection with the construction of a concrete road and the improvement of the main traffic route through the village which was described in the August 2nd issue of Municipal Journal, it was necessary to excavate about a mile of street to the depth of 15 to 18 inches. For this work a Keystone Traction Excavator is being used. The average amount of material handled per day is 200 cu. yds., the excavator cutting about 180 ft. of road 24 ft. wide and 15 to 18 inches deep in a 9-hour day. For removing the spoil, motor trucks are used, the excavator discharging material directly into them. The contractor, Robert D. Daley & Co. of New Haven, owns and operates two 4-ton Riker motor trucks, made by the Locomobile Co., and hires, when needed, a 5-ton Kelly-Springfield truck.

The haul varies as the work progresses, but at present

averages about one-half mile. Three minutes are required by the excavator to load a truck and 10 minutes are required for making the trip to the dump, dumping and returning to position for another load. The trucks are backed close to the excavator so that they can be fully loaded without any delay due to moving the trucks or the excavator. Whenever the trucks are not in place to be loaded, the excavator scrapes the earth into a pile on one side, so that it will be out of the way when the truck backs into place and will be handy for rapid loading.

The excavator is also used for digging up trees, lamp-posts, curbing, sidewalks and whatever other encumbrances are encountered. When delays of this sort are encountered, only 1 or 2 of the trucks are used for hauling the excavated material, the others being used on stone, sand or cement hauling, or other work. Some delay is caused by traffic, which has to be maintained on one railway track and on the street up to the point where actual excavation is being made.

Only one man is assigned to each of the trucks and four are employed on the excavator. Two of these are the engineer and fireman, while the others clean up around the excavator and lay the planks preparatory to moving ahead.

## THE COST OF LAYING WATER MAINS

### Detailed Figures of Costs in Saginaw and Chicago— Pipe, Lead and Other Materials, Labor, Cartage and Other Costs.

The figures given in the tables herewith, showing the cost of constructing water mains in Saginaw, Mich., indicate a considerable increase in cost of pipe line construction for 1916 over 1915. A large part of this is due to the increase in the cost of cast iron pipe, which rose from \$23 to \$30.36 per ton, but some can be charged to a general increase of expense in all branches. The average total cost of 6-inch main, which constituted more than half of that laid each year, was 90 cents a foot in 1915 and \$1.08 in 1916. Of this difference of 18 cents, 11.9 cents was in the cost of the pipe itself.

The cost of laying pipes in the eastern and western districts of the city during 1916 is given in detail in the tables on this and the opposite pages.

For the purposes of comparison, the costs for 1915 are given under the same heads.

#### COST OF WATER MAINS IN CHICAGO.

During 1916, the city of Chicago laid 125.22 miles of water pipe of various sizes, installed 934 fire hydrants and set 1,547 gate valves. All this work was embraced in regular extensions. Accurate cost records were kept in all cases and below are given the detailed costs of constructing about 15 miles of the larger sizes laid during 1916. For the most part, up-to-date machinery and equipment was used in this work.

Line No. 1, comprising 1,360 feet of 24-inch main, was all laid by hand, except that a large part of the trenching was done by machine. Most of the trenching on line No. 2 also was done by machine and the conditions on these two lines were much the same. For constructing lines 3, 4, 5, 6 and 7, very complete equipment was used. This included a trenching machine, a locomotive crane, and air compressor for operating pneumatic calking hammers. On line No. 8, the work was done entirely by hand under considerable difficulty.

(The table giving the Chicago figures will be found on page 330.)

Detailed Costs of Water Mains in Saginaw, Michigan.  
EASTERN DISTRICT, 1916.

Street	Feet of hydrant pipe	Total feet	Size	Price per ton	Amount	Lead, coke and oil	Cartage	Engineering	Labor	Labor per linear foot of pipe	Foundry inspection	Miscellaneous	Feet of main	*Total cost	Total cost per linear foot of main
Eighth	36	144	12"	\$30.36	\$ 3,286.77	\$ 352.52	\$ 68.67	\$ 24.75	\$1,354.08	\$0.530	{ \$ 45.30	Old H'se Conn.	2,590	\$ 5,626.47	\$2.17
Fenton	680	680	6"	30.36	361.29	45.50	5.25	3.15	211.38	0.311	4.87	\$58.50	680	668.66	0.98
Fourteenth	12	734	6"	30.36	389.97	50.11	9.00	5.25	279.44	0.381	.....	.....	722	819.72	1.14
Gilmore	37	37	6"	30.36	51.52	9.72	1.15	1.00	48.25	0.457	0.70	.....	97	127.59	1.31
Glasby	..	464.5	6"	30.36	246.79	40.41	5.22	3.12	170.82	0.368	3.54	.....	464.5	512.90	1.10
Kirk	36	1,211.5	8"	30.36	19.13	4.44	1.00	0.75	25.33	0.704	0.60	Pav'm't	1,211.5	1,707.81	1.41
Linton	..	435	6"	30.36	871.67	109.29	18.54	11.35	369.70	0.305	11.36	Old H'se	435	484.26	1.11
Tenth	24	3,318.5	12"	30.36	12.76	2.95	0.70	0.75	177.00	0.407	3.04	Pav'm't	3,318.5	7,184.82	2.16
Thirteenth	12	1,310	6"	30.36	696.00	98.36	15.72	9.10	10.00	0.417	0.40	.....	1,298	1,378.66	1.07
Twelfth	36	1,329	6"	30.36	706.10	106.37	16.08	9.00	1,658.75	0.496	55.14	Old H'se Conn.	1,293	1,438.71	1.11
Tuscola	12	360	12"	30.36	456.84	{ 55.01	9.37	6.42	181.00	0.511	0.20	.....	360	857.72	2.38
Wadsworth	24	485.5	12"	30.36	616.10	{ 73.45	13.76	4.25	5.00	0.417	6.15	Pav'm't	485.5	1,571.27	3.23
Webber	96	2,544	8"	30.36	1,830.41	{ 232.98	37.20	22.50	10.00	0.324	24.00	Removal old 4"	2,544	3,687.62	1.45
Wilkins	12	313	6"	30.36	51.04	{ 11.00	2.50	3.00	40.00	0.417	1.60	Pav'm't	301	388.84	1.29
Wisner	..	494.5	6"	30.36	166.30	29.39	5.60	2.25	113.25	0.362	3.53	.....	494.5	526.00	1.07



WESTERN DISTRICT, 1916.

	36	1,539	6"	20.36	817.67	{	135.11	18.69	8.47	420.75	0.274	10.36	1,503	1,646.50	1,09
Bates	290	290	2"	20.36	74.24	.....	56.04	8.18	1.00	41.70	0.144	.....	290	120.01	0.41
Bates	342.22	342.22	6"	30.36	342.22	.....	90.05	15.87	4.24	145.56	0.217	.....	342.22	120.01	0.41
Charles	1,261.5	1,261.5	6"	30.36	670.93	.....	11.30	15.87	9.00	352.00	0.225	.....	1,261.5	1,093.8	1.07
Clinton	1,201.5	1,201.5	6"	30.36	670.93	.....	11.30	15.87	9.00	352.00	0.225	.....	1,201.5	1,093.8	1.07
Fayette	856.8	856.8	6"	30.36	425.22	.....	93.22	12.40	1.25	238.31	0.247	.....	856.8	1,013.62	1.02
Groul	752.5	752.5	6"	30.36	399.80	.....	68.32	8.63	6.58	238.31	0.289	.....	752.5	768.70	1.02
Hamilton	72	72	6"	30.36	38.25	.....	7.44	1.00	5.30	238.31	0.302	.....	72	98.70	1.02
Cronk	102	102	6"	30.36	54.19	.....	10.49	1.10	1.50	50.66	0.703	.....	102	114.99	1.37
Maple	1,076	1,076	6"	30.36	571.68	.....	84.28	12.81	1.50	41.56	0.407	.....	1,076	1,006.35	0.95
Pleasant	1,667	1,667	6"	30.36	885.68	.....	188.52	19.81	11.53	330.51	0.228	.....	1,667	1,663.02	1.02
Wood	72	72	6"	30.36	38.25	.....	7.44	1.00	0.75	53.39	0.741	.....	72	101.43	1.41
Davenport	91	91	6"	30.36	48.35	.....	9.72	1.40	1.25	27.00	0.297	.....	91	92.37	1.01
Maple	251	251	2"	25.66	64.26	.....	.....	1.00	1.00	41.89	6.167	.....	251	108.15	0.43
Madison	25.497.8	25.497.8	..	.....	\$19,087.37	.....	\$2,427.26	\$405.79	\$208.22	\$9,158.76	.....	\$671.50	25,017.8	\$35,978.64	....
Totals	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

\*Including specials, valves, valve boxes and hydrants.

\*Including specials, valves, valve boxes and hydrants.

## EASTERN DISTRICT, 1915.

[illegible]

WESTERN DISTRICT. 1915.

WISCONSIN DISTRICT, 1910.									
Ames	2,292	6"	\$23.00	\$944.50	\$123.04	\$27.03	\$	15.70	\$0.197
Ames	2,123	16"	23.00	3,053.25	338.73	82.47	21.25	58.6	5,338.76
Ames	855	6"	23.00	351.10	39.92	10.62	5.85	6.25	720.52
Benjamin	752	6"	23.00	311.54	38.85	9.38	5.10	5.55	655.32
Benjamin	22	6"	23.00	9.89	2.28	4.40	1.25	1.17	31.88
Cooper	166	6"	23.00	69.23	11.00	1.87	1.15	1.24	124.65
Cooper	1,287	6"	23.00	529.12	80.67	16.01	8.75	9.37	1,089.75
Charles	300	6"	23.00	123.63	13.46	3.88	2.00	2.22	275.90
Charles	489.5	6"	23.00	297.69	37.14	6.18	3.40	3.66	411.60
Durand	1,953	6"	23.00	801.09	137.91	24.61	13.25	14.28	1,710.39
Greenwich	454	6"	23.00	187.91	27.03	5.49	3.20	3.56	346.87
Hanchett	271.5	6"	23.00	113.74	15.87	3.76	1.60	2.04	259.5
Harrison	613.5	6"	23.00	222.20	32.48	6.90	4.30	4.50	276.03
Houghton	1,669.5	6"	23.00	687.36	91.77	20.61	11.35	12.92	488.59
Madison	1,669.5	6"	23.00	687.36	91.77	20.61	11.35	12.92	488.59
Niagara	414.00	16"	23.00	65.63	12.02	2.02	1.00	1.92	873.22
Niagara	822.5	6"	23.00	6.86	1.42	1.42	1.00	.92	2.96
Oakley	102	6"	23.00	31.21	47.91	10.31	5.60	6.01	696.63
Oakley	1,432.5	16"	23.00	44.51	8.31	1.37	1.00	1.08	101.84
Porter	641	6"	23.00	2,065.20	292.05	55.50	14.35	36.10	3,665.03
Ruby	38.5	6"	23.00	297.03	51.22	7.12	4.50	4.68	611.04
State	23	6"	23.00	14.84	3.08	.55	.50	.25	40.92
State	477.5	6"	23.00	9.89	2.17	1.25	1.11	1.17	18.00
State	48	6"	23.00	196.81	23.44	5.44	3.35	3.50	427.62
Stone	324.5	6"	23.00	19.78	2.78	.52	.35	.33	48
Webster	2,242.5	6"	23.00	132.52	17.03	4.23	2.19	2.35	401.16
Webster	2,242.5	6"	23.00	132.52	17.03	4.23	2.19	2.35	401.16
Barnard	2,242.5	6"	23.00	108.51	24.67	15.35	16.44	16.44	332.12
Totals	35,628.0			\$25,385.38	\$3,036.48	\$819.91	\$288.60	\$522.12	\$49,505.28

\*Including valves, valve boxes, specials and hydrants.

## Cost of Laying Water Mains in Chicago in 1916.

	1,360 ft. 24-inch Pipe	7,990 ft. 24-inch Pipe	11,120 ft. 36-inch Pipe	2,670 ft. 30-inch Main	10,688 ft. 24-inch Pipe	9,350 ft. 12-inch Pipe	15,533 ft. 24-inch Pipe	5,013 ft. 24-inch Pipe	10,284 ft. 36-inch & 986 ft. 48- inch	4,149 ft. 48-inch Pipe
Pipe .....	2.668	3.175	5.109	4.607	3.201	1.030	3.161	2.846	6.431	2.425
Castings .....	.315	.224	.227	.131	.146	.039	.136	.243	.264	.130
Valves .....	.183	.106	.113	.042	.106	.048	.174	.226	.180	.053
Hydrants .....	.139	.035	.028	.024	.059	.114	.066	.046	.040	.068
Head .....	.205	.242	.460	.385	.336	.089	.233	.239	.373	.184
Mason Material .....	.097	.064	.088	.049	.090	.028	.092	.125	.104	.037
Miscellaneous Material .....	.086	.085	.098	.058	.087	.010	.048	.056	.100	.044
Supervision .....	.139	.108	.062	.073	.073	.024	.084	.099	.124	.069
Calking .....	.248	.274	.215	.188	.303	.074	.243	.149	.318	.319
Laborers .....	1.534	.974	.888	.736	.891	.212	1.089	.851	2.564	.951
Mason Laborers .....	.162	.065	.121	.026	.103	.024	.096	.084	.112	.047
Masons and Foremen .....	.092	.030	.072	.015	.058	.013	.043	.043	.056	.021
Plumber .....	.010	.041	.023	.....	.....	.....	.007	.006	.044	.021
Hoisting Engineer .....	.....	.090	.170	.109	.215	.018	.072	.042	.070	.....
Pipe yard charges teams .....	.154	.245	.223	.336	.341	.083	.190	.303	.478	.111
Other .....	.....	.005	.....	.....	.....	.....	.....	.009	.....	.006
Total cost per foot ..	\$6.113	\$5.956	\$8.615	\$6.765	\$6.014	\$1.823	\$5.830	\$5.692	\$12.229	\$5.421

## ULTRA VIOLET STERILIZATION AT HENDERSON.

As has previously been stated in Municipal Journal, Henderson, Ky., has for some months been using the ultra violet ray method of treating its water supply. This is the first municipal installation in the world of the pressure type. The city obtains its supply from the Ohio River, and until 1916 used it with no treatment except such sedimentation as occurred in the distributing reservoir, which holds about  $1\frac{1}{2}$  days' consumption. Then it contracted with the Pittsburgh Filter Manufacturing Co. and the R. U. V. Co. for a sedimentation, filtration and sterilizing plant with a capacity of three million gallons a day with provision for doubling that capacity later. J. W. Ellms served as consulting engineer.

The plant consists of two coagulating basins each 95.5 by 30 ft. and 16 ft. deep; two baffled mixing chambers 25 by 17.5 ft. and 17.5 ft. deep; six filter units, each 17 ft. by 13 ft. 4 in., with a normal capacity of 625,000 gallons; and a sterilizer consisting of three legs, each comprising 5 units. The detention period in the coagulating basins is four hours with a consumption of 3,750,000 gallons a day, and the capacity of the settling basins is 620,000 gallons. The basins and filters of standard reinforced concrete construction and are covered by a brick building. A clear water well underlies the filters and pipe gallery, and adjacent to this is an underground room 28 by 17 ft. which contains the sterilizing apparatus.

The three legs of the sterilizer are connected in parallel and receive water from the clear water basin and deliver it to the suction well of the pumping plant. Each of the five units in each leg has a lamp box inserted in its side equipped with a clear quartz V-shaped tube that projects into the body of the unit and around which the water is forced to flow in a thin film by means of a baffle placed at right angles to the long axis of the sterilizer. The quartz tube contains a 220-volt, D. C., ultra violet ray lamp consisting of a mercury vapor arc. A stirring device of the screw or propeller type operates in each unit to insure that each particle of water passes within the range of influence of the lamp. On the main switch-board is a tell-tale incandescent so connected with each ultra violet lamp as to indicate if any lamp fails or diminishes in power, a warning bell ringing to attract attention.

The plant was put into operation near the end of 1916. the amount of water treated daily varying from 2,200,000 gals. to 3,200,000 gals. The R. U. V. company guaranteed to produce water free from B-Coli, with a current consumption not to exceed 0.77 kw. per lamp. These guar-

antees were reported to have been met during the test run. The consumption was 92.5 kw.-h. per million gallons.

The following figures are taken from daily tests run continuously for over two months. The bacteriological work was done in accordance with the "Standard Methods" of the American Public Health Association.

## Result of Bacterial Analyses During Test Run.

Sample.	Total No. of Samples.	Total Bacteria per 1 cc., 24 hrs. incubation.		Total B. Coli per 1 cc., 48 hrs. incubation.	
		Maximum Count.	Average Count.	Maximum Count.	Average Count.
Raw .....	25	190,000	85,000	1000.0	276.0
Coagulated .....	25	1,200	720	100.0	45.0
Filter .....	70	320	80	1.0	.35
Influent leg No. 1....	52	95	32	1.0	.260
Burner No. 1.....	48	30	16	.8	.215
" No. 2.....	48	20	8	.8	.200
" No. 3.....	48	16	6	.2	.136
" No. 4.....	48	6	2.1	.1	.09
" No. 5.....	54	3	.31	0.0	0.0
Influent leg No. 2....	53	75	36	1.0	.310
Burner No. 1.....	47	50	12	.6	.273
" No. 2.....	47	20	6	.8	.18
" No. 3.....	47	7	5.2	.4	.117
" No. 4.....	47	6	1.8	.1	.07
" No. 5.....	54	3	.38	0.0	0.0
Influent leg No. 3....	54	95	25	1.0	.326
" No. 1.....	47	55	14	.8	.240
" No. 2.....	47	19	9	.8	.21
" No. 3.....	47	12	4	.4	.110
" No. 4.....	47	6	1.6	.1	.06
" No. 5.....	54	3	.42	0.0	0.0
Tap at pumps.....	34	11	.39	0.0	0.0

Rate of pumping 2,200,000 gallons per day to 3,200,000 gallons per day with little or no variation in results.  
Turbidity of raw water varied from 130 to 880 ppm.  
Filtered water usually clear with maximum turbidity of 5 ppm.

## STATE EXPENDITURES ON GOOD ROADS.

According to the recently published report by the Bureau of the Census on the "Financial Statistics of States," the total outlays for permanent improvements aggregated \$85,099,088. Of this amount, \$33,087,410, or nearly two-fifths, was spent for the construction of new roads and the permanent improvement—such as macadamizing or paving—of existing ones. The greatest outlays for roads in individual states were reported for New York, \$10,742,913; California, \$7,706,376; and Maryland, \$3,563,697.



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## Contributed Articles and Reports.

*Contributions suitable for this paper, either in the form of special articles or as letters discussing municipal matters, are invited and paid for.*

*City officials and civic organizations are particularly requested to send Municipal Journal regularly their annual and special reports.*

## Information Bureau.

*Municipal Journal's Information Bureau, developed by twenty-one years' research and practical experience in its special field, is at the command of our subscribers at all times and without charge.*

## WATER PURITY DETERMINATION BY CORRESPONDENCE.

The indignation to which a certain southern city was aroused recently because the Federal public health service had forbidden the railroads to use water from its supply on their trains may have appeared to outsiders like a tempest in a teapot. But it increased in intensity when it was found that the report of the Federal surgeons did not claim that the water showed by analysis any positive evidence of pollution, but expressed the opinion that the supply was extremely liable to be polluted at any time. Local newspapers and citizens freely used the words "autocracy" and "bureaucracy" in referring to the condemnation of their supply. The mayor pointed out that regular examinations by a distinguished chemist and bacteriologist at "stated intervals" had established the purity of the supply, and pronounced it safe for his fellow citizens, whose lives were as precious as those of railroad travelers.

It seems, however, that conditions on the catchment area from which the city's supply is drawn were such, because of poor sanitation of negroes' cabins thereon, as to threaten pollution; and this was admitted by the city officials, and steps have been taken to remedy the condition.

The moral is one which has been presented several times by Municipal Journal and explained by water supply experts—no number of water analyses unaccompanied by a sanitary survey of the catchment area can guarantee the safety of a water supply. City officials must be taught that analyses of water only provide a basis for judgment of the purity of the sample itself, and

by inference of the water supply at that particular time, but give no warning of the pollution that may enter it the next day, washed in perhaps by a rain storm from a source of pollution on the catchment area.

Even more important than analyses at stated intervals is a sanitary survey of the watershed at such intervals—a personal inspection, and not a report from a distant laboratory upon a sample sent to it by express, even though such laboratory be that of the state board of health or any other of the highest standing.

## COPPER SULPHATE AND FISH.

In a paper before the New England Water Works Association, a large part of which is abstracted in this issue, the effect of copper sulphate upon fish in reservoirs and ponds is discussed. The statements made therein seem to indicate that the preponderance of the evidence is that the use of copper sulphate as ordinarily practiced in destroying algae does not poison fish directly, although the indirect results of such use may be fatal to them. The indirect result referred to is the destruction of such large quantities of the vegetable organisms in the water that the decomposition of these uses up a very large percentage of the available oxygen in the water, and apparently it is this reduction of oxygen that is fatal to certain fish, especially those like trout, which demand water high in oxygen. That it is the deoxidation caused by the decomposition rather than the direct poisoning by the copper appears to be indicated by the fact that comparatively large quantities of copper have been used when the numbers of algae have been small, without killing fish, while in other cases decomposition of algae when no copper has been used has resulted in a wholesale death of fish life in the reservoir.

One conclusion to be drawn from this would appear to be that care should be taken to use the copper sulphate before the algae growth has progressed far in a reservoir, in order that the resulting putrescible matter may be small in amount, and thus deoxidation of the water be kept at a minimum.

## MUNICIPAL WASTE PAPER.

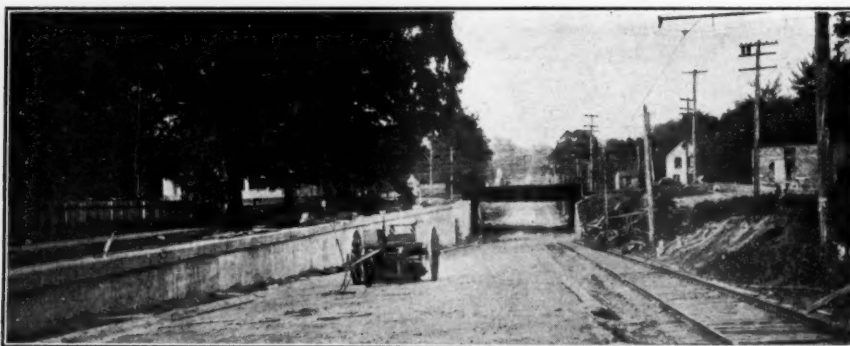
A few days ago a report from a certain western city reached this office. It was bound in imitation leather (paper) and printed on a heavy filled paper, the very sight of which sends shivers all the way to a publisher's pocketbook in these days of high cost of paper—and other things. It was neatly printed and bound, and must have cost the city a considerable sum. It contained 215 pages and weighed just one pound.

We believe cities should be encouraged to get out neat and well-printed reports and we have no quarrel with any city over the amount they wish to spend on their annual report—when they have anything to report. But all the valuable information in that 215-page report could have been printed on a 4-page or, at the most, on an 8-page folder. The report for the waterworks department took up 166 pages. Several pages were blank (the others might as well have been); 89 pages were devoted to a list giving the location, size and length of mains, locations of hydrants, etc., all of which information is valuable as a matter of record, and undoubtedly is on file in the offices of the department, but it has no place in the annual report. Sixteen pages were occupied by a list of the water bonds issued; four pages by tapping permits; eight pages by a tabulated list of mains laid during the period covered by the report; the remainder of information in the 166 pages, excluding possibly 2 or 3 pages, can be classified with that listed above as absolutely worthless to any one outside the department.

The report of the sewer department has 2 blank pages,

7 pages of report, mostly a tabular statement of work done, and 40 pages devoted to a list of locations of sewers constructed in the past. The only valuable thing in the whole report is found in some pages inserted in the rear, giving tabular, and really excellent, costs of water main and sewer construction.

Reports like this are, fortunately, in the minority, but the number of cities sending out really valuable information through their annual reports is small and the sums paid for printing annual municipal reports that serve no purpose except to fill shelves in the local city hall, and waste baskets elsewhere, must run to a goodly sum each year. There would seem to be a field here for a consulting technical editor, who can see that the



WINDSOR UNDERPASS NEARLY COMPLETED.

worthless information is left out, that which should be included is furnished by the several officials, the report is properly printed and distributed, and the cost kept down by these same means.

#### NO CONVENTION OF STREET CLEANING SOCIETY.

The executive committee of the Society for Street Cleaning and Refuse Disposal of the United States and Canada has decided to omit its annual convention this year. The reason assigned is that "the labor situation all over the country is so acute that officials in charge of street cleaning and refuse disposal are averse to leaving the field of their respective activities for even the short time required for attending a convention. Manufacturers and dealers, who compose the associate membership of the society, are, in a majority of cases, so occupied with war contracts and with business growing out of the extreme activity in the metal industries that they would be unable to give time to the convention."

In place of the convention, the committee has provided for the issuing of a special report or journal, to be published in pamphlet form by the secretary-treasurer and a copy sent to each member, and to any interested person who may so request. The members are asked to send, as matter for this pamphlet, such papers, queries, suggestions or motions as they would have presented at the convention, in addition to which the secretary will publish in the pamphlet the important items that would have been included in his annual report. It is urged that all matter be in the secretary's hands not later than November 1.

#### DANGEROUS UNDERPASS ABOLISHED

##### Replacing Narrow and Crooked Underpass and Straightening Road—Excavating Under Railroad Track and Laying Pavement.

Near Windsor, Conn., there has just been completed an underpass and grade crossing elimination on which the Connecticut Highway Department spent nearly \$125,000 in order to eliminate a danger spot and provide a safe and convenient crossing. The old underpass under the tracks of the New Haven Railroad was narrow—too narrow for two automobiles to pass—and there was a very sharp curve at one end. It was so dangerous that everyone was on the lookout, so that few accidents did occur. The sketch shows how the old road curved and how the new construction eliminates all danger and inconvenience.

The plans for the new improvement called for the excavation of an underpass under the railroad tracks, raising the track 4 feet, so as to give sufficient elevation for traffic, and constructing a concrete pavement and sidewalks for the length of the improvement. The contract included the replacement of an old bridge by a modern two-span Warren truss over the Housatonic river; the spans, which measure 109 and 132 feet, respectively, being placed on the old piers, which were reconstructed and reinforced with concrete.

For one reason or another two contractors had thrown up the work, so that it was finally carried to completion by force account by the State Highway Department, under the direction of Robert W. Stevens, division engineer. Men were very hard to get, and most of the time those available did not number more than 15 or 20. During the latter part of the work 16 men were employed.

In the excavation of the underpass a Thew steam shovel was employed, and teams were used to haul out the excavated material. As soon as a hole had been cut through and grade reached, tracks for an electric road



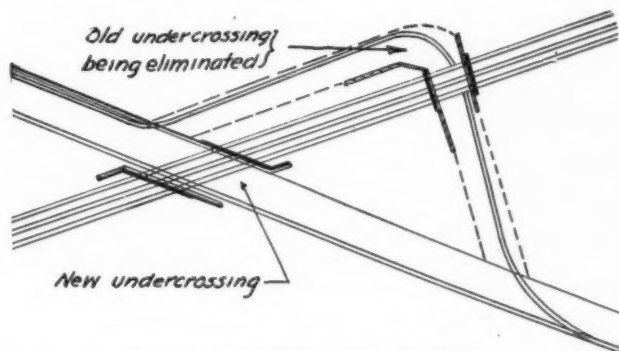
JOB LAYOUT AT BRIDGE, WINDSOR UNDERPASS.



were laid, and materials were hauled by this. Much of the work was done in winter, most of the concrete retaining wall and the abutment piers for the railroad crossing being laid in freezing weather. The sand and stone were heated, hot water being used. Concrete was placed only between the hours of 10 in the morning and 3 in the afternoon, and when laid was protected with tar paper, straw and manure, so that no damage resulted. A tower was constructed alongside the railroad track, and this delivered concrete for the abutments and for a section of the retaining wall.

All the stone for the work was hauled by the electric railway which parallels the road. Sand and cement were hauled by motor truck. As stated before, the electric railway was used for hauling out excavated material also.

About 4,500 square yards of concrete pavement with integral curb, 1,160 feet of curbing and 5,000 square feet



OLD AND NEW UNDERPASSES

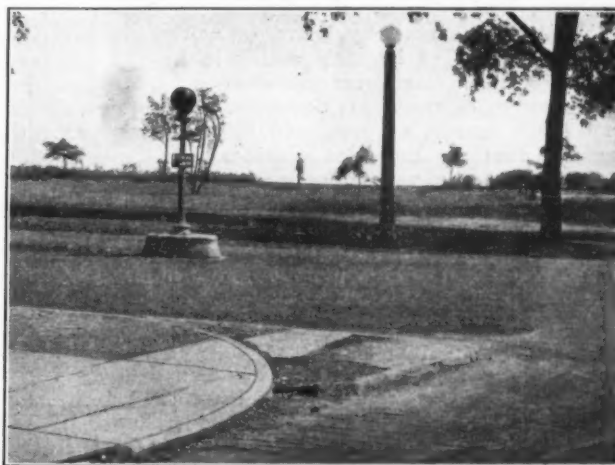
of cement sidewalks were included in the improvement. The pavement was reinforced with Kahn wire reinforcing. Expansion joints were placed every 35 feet. These were of two-ply tar roofing paper. The mix was 1:2:4, the pavement 8 inches thick in the center and 6 inches on the edges, and 18 feet wide. Underdrains were installed where needed, and in one place where it was feared that good drainage could not be secured on account of the heavy clay base, the excavation was carried 18 inches below the grade line, and a fill of sand was made.

When pavement was being laid, all 16 of the men were required, and other work was temporarily suspended. The make-up of the gang was as follows: One engineer, who also fired; a foreman; two finishers, one of whom

floated, while both spaded concrete and worked the template; four men wheeling stone; one man handling cement; two men wheeling sand; three men shoveling stone; and two men shoveling sand. A Koehring No. 14 mixer was used. The barrows were steel measuring barrows furnished by the H. L. Bond Co., Boston. Wooden forms were used.

#### LENGTHENING RADIUS OF CURB CORNER.

The desirability of using long-radius curves for curb lines at street intersections has often been referred to by Municipal Journal, and most cities now employ for all new construction on heavy-traffic streets a radius of not less than 10 feet and generally not more than 20 feet. But corners already constructed with short radii in such



RECONSTRUCTION OF CURB CORNER TO INCREASE RADIUS.

streets should be changed to long radius. How this was done in one instance is shown in the accompanying illustration. At the intersection of Lake Shore Drive and Division street, Chicago, a 14-foot radius was substituted for an old one of 18 inches. This added 7 feet to the width of the roadway at the corner. Such change is especially easy to make if concrete curb is used.

#### THE COST OF SURVEYING ROADS.

Since 1913 the State Highway Department of Illinois has made over 400 preliminary surveys of roads under conditions which made the cost rather high. The roads were generally short sections and entirely disconnected, so that the cost of taking men to and from these sections was large in proportion to the amount of work done. The purpose of the survey in each case was to locate a center line for the proposed road, record the features of the country affecting the location, take cross-sections and obtain information concerning drainage and grade conditions. Nearly 1,000 miles of average road were surveyed, at an average cost of \$26.40 per mile. The average rate of survey was 0.84 mile per day and the average length of each survey was 2.66 miles. As a rule the work was done by two engineers paid \$4.00 a day, three helpers at \$2.50, a team at \$3.00 and incidentals for transportation, board, lodging and supplies, bringing the total cost per day to nearly \$25. The figures are a good indication of the small cost of preliminary engineering work.



STEAM SHOVEL AND TEAMS EXCAVATING UNDERPASS.

## The WEEK'S NEWS

State Highway Problems in New Jersey, Nevada, Minnesota and Pennsylvania—Connecticut Controls Industrial Wastes—Economy in Washington's Waterworks System—Fire-Fighting Organization in Portland, Ore., and Los Angeles—Philadelphia's Over Counter Bond Sale—Federal Government Utilizes Cantonment Garbage—Connecticut Cities Oppose Six-Cent Fares—San Francisco Considers Buying Out Railway Company—The Quebec Bridge—Federal Government, Evansville and Denver Try to Reduce Coal Prices—Baltimore's Civic Center—Housing Legislation in Michigan.

### ROADS AND PAVEMENTS

#### Test Constitutionality of New Jersey Road Plans.

Trenton, N. J.—Constitutionality of the Edge road tax law has been attacked by board of works commissioner Charles P. Gillen of Newark, acting in his capacity as a private citizen, in certiorari proceedings before chief justice Gummere of the supreme court. The major part of Mr. Gillen's attack, as presented by his attorney, is the allegation that the Edge act provides insufficient machinery for the levying, apportioning and collecting of the tax. Thus it came that the papers in the case, the application for a writ of certiorari, were not aimed specifically at the Edge road act, but at the Essex County Board of Taxation. It was an application technically to review the action of the county tax board September 19, adopting resolutions setting the figure on which the tax is to be levied. Mr. Gillen said that action similar to his was to be taken in Hudson and Passaic counties, thus constituting a concerted move on the Edge law. In the formal petition for certiorari, it is declared that the County Board of Taxation had no right, under the Edge law, to take the action it did. Mr. Gillen's taxes, it was set forth, were unlawfully increased by one mill on a dollar by the act of the Tax Board in pursuance of the law. One main point in the attack on the act is that the law apparently provides insufficient machinery for collecting the tax. In making his disposition of the petition, chief justice Gummere said: "Of your objections there is one that seems to be worthy of serious consideration. That is the method of procedure under the law. I am not prepared today to dispose of this question, but will ask that you give notice to the attorney general of your application and appear here with him. I do this for the reason that the interest your client (Gillen) has in the case is almost infinitesimal taken by itself; that is, his interest is no more than that of any one of the state's 2,000,000 inhabitants. The matter is a state matter, not a matter of a ward or a district, and the state is entitled to be heard, I think, before anything at all is done by any judge which might jeopardize the interests of the state." The administration's road plans were one of the chief issues in the recent primary campaign and the controversy has swept the state.

#### Nevada Highway Expenditures.

Carson City, Nev.—The Nevada state tax commission has completed figures regarding estimated expenditures for highways throughout the state during 1917. As the proposed routes of the state highway do not cross any portion of Storey, Clark or Lincoln counties no tax is levied in those counties for this road; but, as the state tax contains a like levy of seven cents on the \$100 on all property in the state, for the state highway, these three counties will be reimbursed in such amounts as they shall have paid into the state on this account, less certain overhead expenses; such reimbursement, however, to be expended exclusively for roads within these counties, but under the direction of the state department of highways. In addition to the state levy of seven cents, the legislature appropriated the sum of \$40,000 for the state highway fund, and the state automobile license tax also goes to the state highway fund. The license tax for 1917 is estimated at \$25,000. The national government will assist the several states in the same amount as the states and counties raise by taxation up to a certain limit, after approval by the department of agri-

culture of the plans and routes adopted by the various states. The amounts raised by the several counties for the state highway fund will be expended solely for the purpose of the state highway department. The sum of \$271,737.19 raised by the several counties for the general road fund has no connection with the state highway, and will be administered solely by the county authorities; but, under the terms of the highway act, the services of the state highway engineer are at the disposal of the counties in the administration of their highway funds if they so elect. The state highway fund from the seven-cent levy, will bring in \$110,603.14. The county road and bridge fund of \$271,737.19 will make the total \$382,340.33. The total state highway fund will be \$594,630.56, half of which will be the federal aid and the state highway expenditures are estimated to be \$866,376.75. A statement by state highway engineer R. K. West reduces the federal aid estimate to \$128,776.60. Surveys, plans and estimates are already well under way for work to begin promptly next spring.

#### High Prices May Mean Wooden Bridges.

Minneapolis, Minn.—The construction and maintenance of wooden bridges in Minnesota will be radically improved and in many places they will be erected where concrete and steel bridges have been planned. The Minnesota Highway Commission has been investigating every form of bridge construction in order to overcome the prohibitive prices of steel and concrete. The chief objection to wooden bridges has been the annual cost of replanking. In Minnesota alone replanking has cost \$375,000 on wooden bridges. After an exhaustive investigation the commission has found a bituminous surfacing that will last as long as the average plank floor and will cost only one-third as much. The bituminous surfacing is spread easily over the plank floor and becomes smooth within a short time. C. M. Babcock, state highway commissioner, has started a campaign which will inform every county commissioner in Minnesota about the new surfacing and the chance to avoid high prices. "The new surfacing is now on a 300-foot bridge at Pillager," said commissioner Babcock, "and we intend to see that it is put on many other bridges. As a result of the high cost of steel and concrete and the uncertain deliveries some poor jobs have been put over on various counties. With the new bituminous surfacing the wooden bridges become entirely feasible, and counting the depreciation, interest and maintenance, they will cost only half as much as steel and concrete."

#### War Problems of Pennsylvania Highways.

Harrisburg, Pa.—State highway commissioner J. Denny O'Neil, who recently assumed office, resumed the monthly conferences of the head of the highway department with the fifteen district engineers. These were inaugurated several years ago, but were soon discontinued. He took up with the engineers the question of abnormal conditions now existing throughout the state, the scarcity of labor and the high cost of materials. So far but one contract for new road work has been awarded this year. Chief engineer W. D. Uhler, second deputy George H. Biles and Julius Adler, engineer of tests, were present. It was decided to form several flying squadrons of laborers and move them from point to point in an effort to close up work now under way before the weather breaks. Each engineer was instructed to make an investigation and report upon the advisability of the state opening up stone quarries in various sections.



The commissioner has announced that the highway department is working in co-operation with the National Defense Commission of the United States Government, and that P. M. Tebbs, consulting engineer in the state highway department, had been sent as a delegate to Detroit, Mich., to attend a conference of various state engineers for the purpose of deciding what roads should be maintained as war emergency roads, in order to relieve the freight congestion and to secure prompt deliveries of any supplies that may be required throughout the war. The highway department is now engaged in repairing the Turtle Creek Hill, in Allegheny County, and has also agreed to put a force of men and trucks on the twelve miles of dirt road in Beaver County, running out to the Ohio state line. On account of the car shortage, practically all of the automobiles and trucks for eastern cities are now transported from Cleveland and Detroit over the Lincoln Highway. In addition to these, a line of freight trucks are now running between Dayton and Boston. At a conference in Pittsburgh recently, statistics were produced, showing that approximately two hundred automobiles and trucks would be brought over the Lincoln Highway each day and that by doing so, thousands of freight cars will be released for other uses. Commissioner O'Neil stated that sufficient men and trucks will be kept on the twelve miles of dirt road in Beaver County to keep it open all winter and that snow drifts will be removed promptly, so that this important route will not be blocked at any time.

## SEWERAGE AND SANITATION

### State Control of Industrial Wastes.

Hartford, Conn.—The recently appointed Industrial Wastes Board is now at work and has decided to take up the various problems in the order in which applications for assistance are received. It is expected that many more calls for help will be received than the limited appropriation will care for. The General Assembly of 1917 passed an act creating an Industrial Wastes Board to be composed of the members of the Public Health Council and five others, two of whom must be manufacturers. The Governor has appointed, in addition to the two manufacturers, two sanitary engineers and the president of the Oyster Growers' Association. This board of twelve representing all interests is charged with the task of solving the problems of stream pollution and taking such action as it deems necessary and feasible to restore the streams to their natural condition. The state health department has said: "All the larger streams of the state and many of the smaller ones are now grossly polluted by both domestic sewage and factory waste. Domestic sewage alone would be a comparatively simple problem, but when combined with industrial wastes of various kinds the problem becomes most complex. Connecticut is an industrialized state, almost every community having its factory or group of factories, and every stream getting its dose of acids, dyes or other chemicals. The state health officials have in recent years studied the stream conditions by survey and analysis—the condition of the water has been ascertained, the points of pollution located and the character of the polluting substances determined, but nothing has been accomplished toward elimination of the pollution. In 1915, authority was given to prevent further pollution, but no funds were provided to carry out the act. This year \$25,000 was appropriated for the two-year period and the special board provided to carry on the work. It will be years before any great amount of pollution will be removed from our streams, although from now on each year should show some improvement. There are many who suffer because of stream pollution who feel that health authorities should secure pre-emptory abatement, but it must be remembered that present conditions are the result of small additions covering many years. The municipalities or manufacturers in many instances had little thought as to the ultimate effect upon the streams. A man sewered his house into a nearby stream and it was barely noticeable, his neighbors followed his example and the stream

became somewhat objectionable, but when the authorities decided to give the entire community the same privilege by establishing sewers to discharge into the stream its condition became unbearable. A manufacturer after burning his charcoal for years in pits, learns that by using iron retorts he can secure valuable chemicals which formerly escaped in the smoke and gases. The new plant is constructed on the site of the old and the acids and tar wastes from the processes of purification make their way into the nearby stream. In both of the cases cited the pollution is the result of development, and to order pre-emptory abatement would be to do an injustice to the individual and to the community. While the health authorities have never contemplated such drastic action, municipal authorities and owners of industrial establishments have naturally resented the merest suggestion of action that might result in serious inconvenience or possible financial embarrassment. At the same time several of the more progressive cities and manufacturers have, on their own initiative, spent thousands of dollars in an effort to purify or otherwise dispose of their wastes. The Industrial Wastes Board is the result of a complete understanding between the health authorities and the manufacturers and it assures a co-operation that will unquestionably hasten the elimination of the pollution of the streams of our state."

### Oil Separators to Protect Sewer Workmen.

New York, N. Y.—Mayor Mitchel has sent a message to the board of aldermen disapproving the proposed amendment to the code of ordinances, eliminating the provision that no garage permit authorizing the storage of volatile inflammable oils shall be issued for any premises which are not provided with an oil separator or other apparatus attached to the house drain for the purpose of preventing such oils from flowing into the sewer. Speaking of the dangerous work of the city's sewer workmen, the mayor said: "I feel that the safety of these men who work daily in the sewers should be considered before oil separators are eliminated. The inconvenience of installing oil separators and their maintenance by garage owners should not be controlling when the lives or health of the city employees may be endangered." The ordinance in question applies only to garages where four or more automobiles are kept. Mayor Mitchel intimated that he would agree to an amendment exempting the outlying districts of the city from the operation of the oil separator law, because in the more sparsely settled districts it might work a real hardship while the danger to sewer workmen from the inflammable oils in those parts of the city was not nearly as great as in the thickly settled sections.

### More States Admitted to Birth Registration Area.

Washington, D. C.—Maryland, Virginia and Kentucky are the latest states to be admitted to the registration area for births by the director of the census, Sam L. Rogers. The registration area for birth was established in 1915, and was then composed of ten states and the District of Columbia, representing ten per cent of the territorial extent of the United States, but containing thirty-one per cent of the country's population. For this area the bureau of the census has recently issued its first annual report entitled "Birth Statistics." As the area grows the annual reports will deal with the births in a constantly increasing portion of the country and will therefore become of constantly increasing interest and value. The outlook for a very rapid growth of this registration area is excellent. The need of complete birth registration is recognized now as never before in connection with the military forces. Since war was declared tests of the completeness of birth registration have been made by special agents of the census bureau in Virginia and Kentucky, and both these states secured a rating of over ninety per cent, which represents the degree of completeness required for admission to the area. Similar tests are now being made in Indiana and New Jersey, and before the year is over will be conducted in North Carolina, Ohio, Utah and Wisconsin. Several other states are nearly ready to seek admission, and it is probable that the birth registration will be

more than trebled in size and will contain over two-thirds of the population of the United States. A story is told of one physician who recently became so thoroughly aroused to the desirability of recording births that he reported to the local registrar 450 births which had occurred in his practice since 1900.

## WATER SUPPLY

### Ask Public Service Commission to Permit Meters.

South Bend, Ind.—The board of public works has petitioned the Indiana public service commission for permission to install a meter system in the waterworks department. The rule was adopted by the works board, but is subject to approval of the state commission before it may be put into operation. The petition alleges that there are 15,000 service connections in the city, 12,000 of which are active. About half of the active service connections are not metered and the rules prescribed by the board of works will place all connections on a metered service by July 1, 1919. The city has been divided into three zones. The first zone must be using the system by July 1, 1918, the second by August 1, 1919, and the third zone by July 1, 1919. The reasons given for the proposed change to the meter rate for all persons using the flat rate are that the two methods permit an unlawful discrimination as to rates, that non-metered water is frequently wasted, causing a higher cost of operation than would be if all services were metered, and that the higher cost of operation in part is unjustly borne by metered service which does not in any way contribute to this wasteful condition. Another reason given is that expansion of the system under the present rate method will be necessary, compelling an additional outlay of money for this purpose, unless the meter system is adopted, which would stop waste and make the capacity of the plant sufficient to supply the demands of the city for several years to come.

### Economies Proposed for Capital Water System.

Washington, D. C.—According to Col. W. L. Fisk, Corps of Engineers, retired, in charge of the District water supply system, including the aqueduct and the filtration plant, in his report of operations for the fiscal year ended June 30 last, the average consumption of water during that period was 53,810,000 gallons a day, and the average per capita consumption was 149 gallons a day. In the previous year the average consumption was 51,910,000 gallons a day and the average per capita consumption was 145 gallons a day. The greatest daily consumption during the past year was 68,820,000 gallons, in February, and the next highest was 68,260,000 gallons, in June. The lowest daily consumption was in March when but 39,060,000 gallons were used in twenty-four hours. The safe daily capacity of the system is considered to be 65,000,000 gallons. The maximum capacity of the conduit is estimated at 75,000,000 gallons and of the filtration plant at 90,000,000 gallons. The purification of the water during the past year is reported as very satisfactory. The average turbidity was reduced from 247 to 0 and the bacterial content from 4,760 to 12 per cubic centimeter. Col. Fisk points out the impossibility of determining in advance the water needs of the district without records as to the consumption in federal buildings, and also the difficulty of fixing the responsibility for the waste of water where large consumers have a wholly unmeasured supply. The estimated cost of completely metering all government services is \$32,000 and the district officer earnestly recommends the appropriation of that amount to be immediately available. Attention is invited to the large consumption of water at the government printing office, where the quantity used for the past fiscal year averaged 2,927,400 gallons per day. That large consumption is attributed to the fact that the engines at the office use filtered water for condensing purposes. Various plans are suggested for remedying the situation. One is to furnish the government printing office with power from the central power plant, which will use river water for condensing. Another plan is the installation of a suitable system of cooling towers in the building. Either of these measures, it is said, would apparently

reduce the consumption to a maximum of about 550,000 gallons a day. The cost of the water saved, at \$2.45 per 1,000 gallons, would be \$58.25 a day, or \$21,261 per year, and, in addition, Col. Fisk says, the District of Columbia would be saved its present heavy expenses for pumping condensing water through the sewers. Plans are submitted for installing a ten-inch water main across the Key bridge at Georgetown for the purpose of supplying city water to Fort Myer, Arlington cemetery, the naval radio station and the agricultural experiment station.

### Waterworks Officials Praised by State Examiners.

Canton, O.—The Canton waterworks department is in a prosperous condition, according to the report of state examiners H. D. Defenbacher and E. A. Moriarty. No findings of any character are made against the department. The report points out the fact that the department had another successful year, the total revenue for 1916 exceeding all expenses by \$33,000. The free service rendered during the period covered by the report, from April 1, 1916, to March 31, 1917, was \$34,000, while the balance in the waterworks sinking fund was increased by \$19,000. "The officials have made this showing possible by conducting the affairs of the department in a careful and business-like manner and deserve special commendation," says the report. Mayor Stolberg has been urging the city water commission that a storage reservoir and a surface water reservoir are greatly needed. He advised a reservoir of 20,000,000 gallons' capacity to reinforce the domestic water supply and urged an impounding reservoir to provide for the storing up of about 4,000,000,000 gallons of surface water for the use of manufacturing establishments. He also says that every individual or company wasting water should be metered and pointed out that the public schools are now using about one-fourth as much water as formerly, simply because meters were installed and charges made for the water used. City clerk W. E. Jackson, secretary of the board, has been instructed by the commission to secure data from every city in the state of between the populations of 50,000 and 200,000, with special reference to a reservoir. Jackson was also asked to get from each manufacturing plant in the city information regarding the well water supplies established by these companies.

## STREET LIGHTING AND POWER

### Military Authorities Seize Light Plant.

Chillicothe, O.—Military authorities in charge of Camp Sherman, near here, seized the plant of the Chillicothe Electric Railroad, Light & Power Company. Guards with loaded rifles were under orders to permit no civilians near the plant. Fred Bursch, camp electrician, was placed in charge of the electrical supply source. The seizure followed an order from Chillicothe city authorities to cut off the electric light current to Camp Sherman, if need be, in order that Chillicothe street lights might be supplied. The plant has been making an attempt to light both the city and camp. Mayor Cahill sent word to the city engineer to turn off power to Camp Sherman even though it meant no light in the scores of barracks and officers' quarters. Military authorities, under direction of the camp quartermaster, took possession, turned off Chillicothe street lights and turned all power to Camp Sherman. The military police force of the camp was detailed to see that the plant was operated. The guard received loaded guns with orders to shoot if any attempt was made to shut off the military post's electric lights. The arrangement under which the Chillicothe company is furnishing service to the plant is a temporary one, pending completion of a 50-mile transmission line under construction by the Ohio Utilities Company, an associated corporation. When the transmission line which is under construction from a point near Columbus is fully completed both the city of Chillicothe and Camp Sherman will be supplied from this line and the Chillicothe plant will be held as a reserve station. It had been anticipated that the transmission line would be finished on Sept. 10 or 15, but delays in the arrival of materials, even with Government assistance in hastening



shipments, made completion impossible on schedule time. As the requirements for energy for Camp Sherman exceeded preliminary arrangements it was proposed to shorten the street lighting hours in Chillicothe about one hour each evening during the week. No interference with the supply of energy for residences or power for any other purpose than street lighting was anticipated when this arrangement was made.

#### City Returns to Municipal Ownership.

Menasha, Wis.—This city is now re-engaged in the commercial electric lighting and power service after a lapse of more than two years resulting from legal action taken by the local company to restrain the city from operating its plant. The Wisconsin railroad commission has issued a certificate of convenience and necessity authorizing the operation of the Menasha plant according to the terms of a contract entered into with the traction company and under the supervision of the railroad commission. Work is now under way in making connections with business places and residences. The traction company and the city are working in harmony as a result of the agreement entered into. In cases where the traction company has been supplying light and power and where the patron desires to make the change the city is buying the equipment of the traction company. In cases where the city had already installed service it is only necessary to make a connection with the city power. The same is true where the prospective user has never been a patron of either the city or the traction company.

#### City Appeals in Lighting Assessment Case.

Niagara, Falls, N. Y.—The city council has directed corporation counsel Moore to take an appeal to the appellate division from a decision of justice Sears of the supreme court, holding that local lighting assessment No. 3—levied against Main and Third street property owners to pay one-half the cost of the ornamental lighting system—is null and void. Mr. Moore said that if the Sears decision stood he did not believe those property owners who had paid their assessment could recover what they had paid. He said the contractor had already been paid for the work. The court held that in the year 1914, when the board of public works authorized and directed the improvement in question to be made, the charter then in force did not recognize street lighting as a local improvement and no local assessment therefor could be made. It held that if it be assumed that the so-called Home Rule Act authorized such local assessments, the improvements would have to be made in accordance with the terms of the charter then in force. It held that this was not done as the board of public works omitted to bring the matter of the improvement before the common council. This omission rendered all of the acts and proceedings, initiating and authorizing the improvement to be made, null and void.

## FIRE AND POLICE

#### Reorganization Follows New Leave Schedule.

Portland, Ore.—The new schedule of one day off duty in each four days instead of one day off in each six for all members of the fire bureau is now in effect. With the inauguration of this arrangement, truck company No. 5, engine company No. 11 and engine company No. 16 were disbanded, as a result of the general reorganization of the fire bureau. The plans provide for the elimination of 23 horses and at least 15 firemen, and it is believed by commissioner Bigelow and the board of fire chiefs that the change will not impair the general efficiency of the fire fighting force of the city. The firemen are elated over the order granting them more time off duty. The abandonment of the station at Twelfth and Powell streets, engine company 11, will leave a large, thickly settled territory without full fire protection. In the reorganization, the auto apparatus will be shifted so as to cover additional territory. The most important change in this direction is the placing of an auto engine in the station in Sellwood. The situation will be closely studied and if more changes for the reduction of expense may be made without impair-

ing the service they will follow in the future. There was a difference of opinion among the firemen as to what time their leaves should start. Some were in favor of having their 24 hours off duty begin at 7 p. m. and end at the same hour the following day. Others preferred being off duty from 8 a. m. to the same hour the following day. Commissioner of public affairs Bigelow ordered a vote taken in the various company stations on the question to settle the contention, with the result that 21 companies voted for the leave to start at 7 p. m., 16 voted for the leave to begin at 8 a. m., and the other company could not arrive at a decision. Commissioner Bigelow ordered the lay-off to begin at 7 in the evening.

#### Firemen's Pension Law in Colorado.

Denver, Col.—The firemen's pension law recently passed by the Colorado legislature has been construed by attorney-general Hubbard. The attorney-general held that it could be made effective in cities or towns which had created a board of trustees for pension administration, consisting of the mayor, treasurer, city clerk and one member of the fire department, which had filed the names of these trustees with the secretary of state, and which owned fire apparatus or equipment to the value of \$1,000 or more. The town's fire department may be either paid or volunteer, according to the opinion.

#### Police and Firemen Get Raise.

Mansfield, O.—Mansfield police and firemen are to receive an increase of 15 per cent in salary. The new figures are to become effective as soon as law allows and both departments are to be strengthened by the addition of a new office, to be known as assistant chief, according to legislation passed by city councilmen. The increase in salary comes after police and fire department heads, on the sanction of safety director Hughes, had told members of the county budget commission their departments would be shattered by resignations unless higher wages were paid the men. Under the conditions of the increase, patrolmen and firemen will receive \$85 monthly for their probation period and \$92 thereafter; lieutenants will receive \$97.50; captains, \$103.50; assistant chiefs, \$109.25; and chiefs, \$115.

#### Install Negro Fire Company.

Los Angeles, Cal.—The city council has instructed the fire commission to install a company of negro firemen in the engine house at Fourteenth street and Central avenue. The members of the whole company now stationed there will be distributed among the other companies of the city where vacancies exist. There are 24 vacancies now in the fire department, due to enlistments and selection for service. The civil service commission has a large number of eligibles on its list, but it is said that none of the white eligibles is willing to accept any of the positions, which were merely for the term of the war. On the other hand, of the 51 negro eligibles, a large number are willing to take employment in the department on the conditions offered. There is a good deal of reluctance to mixing the men, as this plan does not seem to have worked out well, according to some of the department officials, and the only alternative was to form a separate company. The engine-house at Fourteenth and Central is in the midst of a negro neighborhood, and it is not believed that any serious objection to the location of a colored company there will be forthcoming. The only member of the council who opposed this plan was councilman Farmer. His objection was based largely on the fact that a removal of the white company at this location will necessarily compel a derating of some of the white officers, and on the further ground that there are no negro eligibles for engineers on the civil service list. He does not believe that the placing of white engineers in a negro company is likely to work out well. The civil service commission has two lists of eligibles for the fire department—one white and the other negro. The commission insists that this was done at the request of the negro men themselves a few years ago, but on the other hand some of the negroes contend that it has opened the way for a great deal of unjust discrimination against them on the part of chief Eley and others in the department in the matter of appointments.

## GOVERNMENT AND FINANCE

### Philadelphia Sells Big Bond Issue Over Counter.

Philadelphia, Pa.—The city treasurer has sold within a week a \$7,275,700 bond issue over the counter. The issue was of 4 per cent, thirty-year bonds and were sold at par in the city hall. The Sinking Fund Commissioners bought \$1,500,000. Great public confidence was expressed by purchasers and the city officials were highly gratified at the results of the sale. Mayor Smith subscribed \$2,500. There were many small and out-of-town buyers. On the first day of the sale \$3,016,800 worth of bonds were sold.

### Votes Against Tax for Publicity.

Tallahassee, Fla.—The city has voted down a half mill tax for publicity purposes by a majority of 26 votes. A bill providing for such a tax passed the last legislature with a referendum clause, and now the people at the polls have expressed themselves against it.

### Harrisburg's Many Mayors.

Harrisburg, Pa.—So far as is known no city of the third class in the east can equal Harrisburg's mayoralty record for the last six months. Mayors to the number of four have served the city since April 1. In April Mayor Ezra S. Meals died. City clerk Charles A. Miller was appointed. Mr. Miller died on June 12. William L. Gorgas, a member of council, became acting mayor. The courts named J. William Bowman to serve until a mayor is elected in November. The successful candidate in the election will be Harrisburg's fifth mayor in less than eight months.

### City Wants County to Raise Taxes.

Toledo, O.—The city has filed a mandamus suit against the county auditor in the state supreme court. The purpose is to force the auditor to certify a full five-mill tax levy for the city, as provided by a city ordinance. The prosecutor advised the auditor not to grant the request, as it would be in violation of the Smith one per cent law, and then the auditor notified the city law director of his refusal. Assistant prosecutor Seney went to Columbus to ask the attorney general to assist him in the case, for the reason that the action is one of importance to all cities operating under the charter form of government.

### City Manager Plan Involved in Election.

Altoona, Pa.—Altoona will have a chance to vote on the city manager form of government at the polls in November. In the recent primaries William S. Westfall, Charles H. Cassidy, John P. Lafferty, and N. Augustine Stevens, each of whom has pledged himself to pay \$2,000 of the \$2,500 salary which the councilmanic office carries toward the salary of a city manager in event of his election, were nominated. W. C. Myton, Ira J. Shelley, George W. Kohbler and John Frank E. Rooney, none of whom favors the city manager plan, in so far as giving up a part of the prospective councilmanic salary is concerned, are the other four on the November ticket, so that the issue is clear cut. While the vote was light the day's campaigning was spirited, the city manager proponents being out in force to insure the selection of their candidates in the final eight.

### Railway Company Tax Valuation Upheld.

Trenton, N. J.—The New Jersey Board of Taxes and Assessment has sustained the action of the Mercer County Tax Board in fixing the assessment of the Trenton & Mercer County Traction Corporation for 1916 at \$2,069,903. The city of Trenton and six other municipalities in which the company operates had fixed the original assessment at \$2,189,440, but the company asked that it be reduced to \$1,041,972. The state board stated that its duty under the law was to ascertain the market value of the property as of May, 1916, and that in dealing with the class of property concerned it would consider original cost, reproduction cost, depreciation, etc., as elements in estimating market value. The board said that its chief engineer had appraised the physical property at \$1,500,851, and that a

reasonable allowance for going value, or "that value which attaches to the property as the result of the unity of its ownership and use and its established system of successful operation," would be \$569,052, the difference between the value fixed by the county board and the physical value.

## STREET CLEANING AND REFUSE DISPOSAL

### Hog Yards Forced Out of City.

Council Bluffs, Ia.—East Omaha's hog ranches, established to consume Omaha's garbage, have been ordered away by the city council. After listening to complaints of residents of the exclusive Carter Lake club district, who said that the south winds wafted an almost unbearable odor from the hog yards through their homes, the council instructed the health officer to see that the ordinances forbidding the feeding of hogs within the city limits be enforced to the letter. This means that that part of East Omaha which lies within the corporate limits of Council Bluffs shall not be the location of any hog feeding ranches, and those now doing business there must get out. This includes a 10-acre tract given over entirely to the feeding of garbage to hogs. On this land Carl Lorensen, who has a contract with the city of Omaha to remove all the garbage from a certain district, has established quite an extensive plant, capable of handling several thousand hogs. He personally pleaded with the council not to legislate him out of business, stating it would cause him a heavy loss, as he was bonded to fulfill his contract with the Omaha council. The council took decisive action to forestall any attempt to locate a hog ranch outside the city limits of East Omaha but in such a location as to annoy Carter Lake residents by passing an amendment to the present garbage ordinance making it unlawful to haul the stuff from outside the city, meaning Omaha, through Council Bluffs streets. This last action was taken when it became known that an Omaha company contemplated establishing a feeding yard which did not lie within East Omaha but was just over the state line in Nebraska. So situated, it would still permit an offensive odor to float toward Carter lake.

### Utilizing Garbage from Cantonments.

Washington, D. C.—The Food Administration has made public the following: "The War Department has taken elaborate and comprehensive precautions to prevent waste in the Army cantonments, which will soon contain more than 2,000,000 men, and in the embarkation camps. In the feeding of the men waste will be minimized through the fact that the food will be prepared under the direction of mess cooks, who will be trained by special courses in Army cooking schools. The Food Administration has received from the Secretary of War an announcement of a thorough-going plan for conserving all the waste material of the National Army camps, which will result in salvaging many thousands of dollars. The Army's first consideration in planning this work has been the sanitary and hygienic problem. At each cantonment the wastes will be collected and transported to a single 'transfer station' under the direction of the sanitary inspector. Through the use of the two-can system wastes will be tightly inclosed throughout their collection. Sterilized cans will be substituted for the filled cans at the kitchens, the nuisance of disagreeable odors and danger from flies being reduced to a minimum. Every step in the process of reclamation and utilization is carefully safe-guarded and is under the absolute direction of a sanitary force, each contractor being placed under heavy bonds. At the transfer station the wastes are turned over to a contractor, who will remove them to a point at least 3 miles distant from the reservation. There the wastes will be completely sorted. Bottles will be sterilized and sold for commercial use. Tin cans will be baled and the solder, tin, and iron reclaimed. Paper, which is estimated at about 5 tons per day, will be baled. Bones will be kept separate and ground for fertilizer. The hides of dead animals will be removed



and the carcasses 'reduced' for grease and fertilizer. The chief items of waste will be the garbage and the manure. It is estimated that there are 1,200 animals at each cantonment, producing 120 tons of manure per day. At the rate of the report the manure from 11 cantonments had been sold for \$240,900 annually. The greatest element of saving is through the garbage. This has been sold for an annual price of \$446,394.50. The garbage from 13 of the cantonments will be used for feeding swine. It is estimated on the basis of experiments conducted at the Chilli-cothe cantonment that the garbage waste from 10 to 15 men will feed one hog and enable it to add to its weight 1 pound per day. At this rate the garbage from these 13 cantonments will produce 18,980,000 pounds of pork per year. When not used for feeding, the garbage will be 'reduced,' that is, cooked at high temperature, the grease extracted, and the remainder ground and used for fertilizer or feeds. By the method of incineration formerly in use, not only would all these valuable waste materials have been destroyed, but it would have cost approximately \$700,000 for the installation of incinerator plants and an annual charge of approximately \$595,000 for their operation. When we add to this saving the amount annually received by the Government from these wastes, the net saving the first year amounts to \$1,707,840. The effect of this new plan, therefore, is not only to conserve large quantities of valuable food wastes, fertilizer, etc., but to turn into a large profit what has hitherto been a very considerable expense."

#### Economy Empties Garbage Cans.

Sioux City, Ia.—There has been a decrease in the garbage gathered by the thirteen garbage men of the city to the amount of forty tons a month. The biggest point of economy exercised by the housewife is in the saving of bread, according to Mike Carrig, head of the garbage collection department. "It is very seldom that we now see whole loaves of stale bread and stale rolls which used to appear frequently in the cans before the United States entered the war," asserted Carrig. "Also I have noticed that the potato peelings and the parings of other vegetables are thinner and show less waste than formerly existed." The garbage gatherers are taking up from 300 to 500 pounds less garbage a day than they did three months ago. The city produces about 35,000 tons of garbage a year, which includes the garbage collected by the gatherers employed by the city and the garbage of men who collect it for their own private use in feeding pigs. The city probably would go into the pig feeding business if the people of the city would use two garbage cans instead of one in caring for their garbage, according to mayor R. J. Andrews. "It is necessary that one can be used for rubbish and another used for the garbage which comes from the kitchen," said the mayor. "The garbage which comes from the kitchen could be very profitably used in feeding pigs, but the city could not consider a plan of this sort until the people are educated to a point of using two garbage cans. There is an ordinance now in effect which provides for the use of two garbage cans, but it is almost impossible to enforce it. People, as a rule, resent the instructions from city officials as to the use they should put their garbage to, and there are some, who, if they thought there could be any money made by the preservation of garbage, would not tolerate helping the city unless their own pocketbooks received some tangible benefit."

## TRAFFIC AND TRANSPORTATION

#### Cities Oppose Six-Cent Fare Order.

Hartford, Conn.—Beginning Oct. 1, the Connecticut Company of New Haven raised the fare on all its lines throughout the state from 5 cents to 6 cents. The increase of 1 cent, or 20 per cent, it was estimated, would net the company an annual additional revenue of \$1,730,000, based on its revenue from passenger fares during the last year. The company's statement follows: "Effective Oct. 1, 1917, the rate of fare will be increased to 6 cents. To relieve

passengers of the necessity of carrying the coins necessitated by this change in fare, seventeen tickets will be sold for \$1 at the local office. This increase is necessary because of the alarming increase in the cost of performing transportation service as well as the need for increased revenue to enable the company to finance the increasing demands for improvements of all kinds. The conditions at present confronting the company show that the present rate of fare is no longer reasonable, and it is clearly the duty of those charged with the conduct of the business to establish a reasonable rate of fare, which, after careful consideration, has been decided to be 6 cents. Some time ago the Connecticut Company announced that it intended to cancel the practice of giving six tickets for 25 cents in Waterbury, and following a protest by the city, which held that the cancellation of the tickets was actually an increase in the rate of fare, the case was taken to the Superior Court. The court ruled that the company had a right to cancel the practice of selling the reduced-rate tickets. The increase affects 692 miles of road and more than 35 cities, among them the following: Hartford, New Haven, Bridgeport, Greenwich, Waterbury, Meriden, Stamford, Norwalk, South Norwalk, Berrien, Noroton, Rowayton, Westport, Southport, Naugatuck, Fairfield, Milford, Orange, Shelton, Derby, Ansonia, Branford, Wallingford, Middletown, Glastonbury, Manchester, Rockville, Stafford Springs, New Britain, Windsor, Plainville, Winsted and Torrington. The mayors of Stamford, New Haven and Bridgeport have been in communication and have presented the situation to their councils. It is expected that the cities will officially unite to protest to the public utilities commission.

#### Arbitrate in Municipal Car Strike.

Monroe, La.—The strike of the employees of the municipal street railway has been ended by arbitration. The strike was a protest on the part of the union against the action of the city government in voting to adopt one-man cars. The men held that their contract with the city called for a motorman and a conductor on each car. Pending arbitration of whether the intent of the contract between the city and carmen is for two men on each car, service was resumed on the one-man plan. Also pending arbitration, the men will receive a flat rate of 30 cents an hour, instead of 22 to 27 cents as heretofore. All the striking employees were reinstated with seniority rights.

#### Jitney Regulation in Indianapolis.

Indianapolis, Ind.—The city council has approved an ordinance regulating jitney buses. It provides that no more than the comfortable seating capacity of the car shall be carried, based on the designated seating capacity of the model of car used. A license is fixed at \$10 for cars seating five passengers, \$15 for cars seating seven passengers, and \$25 for cars seating twelve or more passengers. Jitney operators must also file indemnity bonds providing for damages not exceeding \$2,500 for one person and \$5,000 for any one accident. The ordinance also provides that the route to be followed must be designated, and that this route cannot be changed until the operator has filed a notice of the new route with the city controller. The driver must charge a 5-cent fare unless the amount is specified by a large sign displayed on the front of the car.

#### San Francisco May Buy Railways.

San Francisco, Cal.—While the strike of the employees still continues, although service is slightly improved, the public utilities committee of the board of supervisors has unanimously adopted a resolution recommending that the city purchase the property of the United Railroads if equitable terms can be obtained. On the previous day a committee of citizens and bankers who compose a committee to reorganize the finances of the company presented a proposal to the city providing for the appraisal of the physical property and the purchase of it by the city on the instalment plan. It was proposed that the city agree

with the company on a year to be taken as a fair measure of net earnings, or that an average of five years' net earnings be taken and this sum paid by the city each year for every year of the franchise. This method would involve no bond issue, but would be carried out by a charter amendment approved by the citizens and the legislature. Such a charter amendment election cannot legally be held until July 19, 1918, according to an opinion by the city attorney. The valuation of the railroad property is now being made by the state railroad commission, but it is thought that this value will not be used under the proposed plan of municipalization.

### MISCELLANEOUS

#### Completing Work on Quebec Bridge.

Quebec, Canada.—After the fatal collapse of 1907 and the accident of 1916, work is now being completed on the famous Quebec bridge after the successful placing of the huge suspended span. While it is not expected that the final work can be ended before the close of the year, it is hoped that trains may be able to use the new bridge within a few weeks. The hoisting system has been dismantled and work has been begun on the flooring of the span and the footwalks. The hoisting of the span was dramatic and watched by thousands during the four days. The span was built and erected in the same way as the one lost last year. Many records were made. The span was the greatest individual fabricated piece, the heaviest ever floated and the heaviest ever jacked, and with the longest lift. The span structure weighs 5,400 tons and it was floated  $3\frac{1}{2}$  miles on scows. By the aid of hydraulic jacks and lifting links it was raised a total of 150 feet. Work was done only during the day. The span was carried on six scows and floated out at early morning by two tugs and a strong tide. The ends were fastened to the lifting chains and within two hours the scows came free and the span hung clear while the spectators watched with breathless interest. The jacking continued for three days, the upper links of the hoisting chain being let down as they came up. Only one minor accident occurred which slightly injured one workman and caused a half hour delay. When the last of the eight pins was driven with a few easy taps the whole river and bridge resounded with whistling and cheering which was taken up by every bell and automobile horn in the city of Quebec.

#### Administration of Federal Fuel Regulation.

Washington, D. C.—The federal organization to control the coal supply is being developed in every state, county and city. The fuel administrator has chosen a representative of the Fuel Administration in each state and territory. He will also appoint in each state, in conjunction with the state representative, a committee of citizens who, with the representative, will assume direction of the regulation of the sale of coal in that state. No person will be appointed, either as a state representative or on any of these committees, or any of the committees mentioned below, who is connected with the local coal industry. Each state representative, as soon as appointed, will choose a committee of citizens in each county of the state and in each city in the state having more than 2,500 population. The state representative and the state committee are chosen directly by the fuel administrator with the approval of the President. The county committees and the city committees will be chosen directly by the state representative. The state committee will at once ascertain the amount of coal in the state available for use during the coming winter and the amount of coal needed to meet any deficiency in the supply, based on last year's consumption. It will be the duty of the various committees to ascertain and report to the fuel administration the reasonable retail margin (the cost of local distribution and a reasonable dealers' profit to be allowed). This margin, when duly fixed by order, together with the cost at the mine named by the President, the transportation charge and the jobbers' commission, when sold to a jobber, will constitute the price to the consumer. The fuel administration will make public from its local committees in each community

sufficient data to enable the individual consumer to ascertain for himself the established price. These figures will be compiled with relation to local needs in order that the fuel administration may, if necessary, apportion the supply of coal with careful regard to the greatest existing needs. There are many communities in which there is no supply of coal available at retail prices. A very large proportion of the coal supply available for the coming winter is under contract. These contracts, which are allowed to stand for the present, were made prior to the President proclamation and very largely limit the amount which may be placed on sale at retail prices based on the Presidents' order. It is absolutely essential, however, says the fuel administration, that a sufficient amount of coal be put on the market at once at these prices to meet the needs of domestic consumers. The fuel administration believes that this supply of coal can be made available, by voluntary arrangement between the operators and those with whom they have contracts, and thus make it unnecessary for the fuel administration to exercise or recommend the powers, the exercise of which is provided in the Lever act.

#### To Vote on City Planning.

Spokane, Wash.—Spokane's voters will ballot at the municipal election in November on the proposition of organizing a city planning commission. Commissioner Fassett's ordinance providing for the submission of this question to the voters has been passed as an emergency measure by the city council. The ordinance purposes to change the charter to provide for the appointment by the city council of a commission of ten men to serve without pay, who will act as an advisory board in the city's physical growth and development; the designing of public buildings; naming and numbering of streets, the solution of housing problems and various other questions for the benefit of the city and its people in general.

#### Fort Smith Is One Hundred Years Old.

Fort Smith, Ark.—Heralding "the greatest celebration that has ever been attempted in the southwest," Fort Smith is to welcome its hundredth birthday in a lively week from Oct. 8 to 13. All friends and neighbors are invited to take part in the attractive program. The first day will be devoted to "Fort Smith as She Is Today"; the second will be "Industrial and Agricultural Day"; the third will be "Historical Day," with a parade reproducing the city's history in miniature floats; the fourth will be celebrated with the coronation of the king and queen of the centennial; the fifth will be "Fraternal Day" and the week will wind up with a "Grand Finale." Big carnival features; electrical and automobile parades; a realistic attack on old Fort Smith by a band of Indians; prize agricultural displays; band concerts and numerous other amusements are promised.

#### Condemnation and Bond Issue to Get Civic Center.

Baltimore, Md.—With new authority in the form of another ordinance passed recently by the city council for the acquisition of property for the proposed civic center, the mayor and city council, through city solicitor Field, have filed condemnation proceedings for several pieces of property. The proceedings instituted recently constitute a re-opening of the fight between the property owners in the proposed civic center and the mayor and city council. While some of the property has been acquired without a fight by the city, several of the owners of the larger tracts have served notice that they proposed to hold on to their property as long as possible. In the former fight, in which the city lost, the ordinance under which proceedings were instituted delegated the authority to purchase and acquire property to the board of estimates. Judge Bond held in that case that the board of estimates had no right to condemn property because it was not a governing power, but merely an advisory board. To overcome this objection a new ordinance was passed in which the power to purchase and condemn property was given to the city solicitor. This new ordinance also adds three additional blocks to the proposed civic center, which is now bounded by Lexington, Gay, Fayette streets and the Fallsway. This will,



therefore, make the civic center extend from the Fallsway to the city hall. Steps toward allowing the voters to decide whether the Civic Center, St. Paul street and other contemplated park improvements shall be made at this time were taken when the council passed an ordinance authorizing the issuance of the \$3,000,000 park loan authorized by the General Assembly of 1908. By the terms of the ordinance the stock will be redeemable on November 1, 1957, or 40 years from next November; that it shall be issued in sums of not less than \$100 and shall bear interest at not more than 4 per cent, to be paid semi-annually. It will not be a burden on the taxpayers, as the sinking fund and interest provisions must come from the park tax paid by the United Railways and Electric Company. It is provided that \$35,400 shall be paid into the sinking fund each year in addition to the interest. The park board will have control of all expenditures, as it is stipulated in the measure that all subsequent ordinances for improvements to be paid for out of the loan shall be referred to and approved by the Board of Park Commissioners. The ordinance is broad and liberal in stipulating the uses to which the money may be put. It will be submitted to the voters at the November election.

#### Denver Leases Coal Mines.

Denver, Colo.—The city has met with an instant response in its plan of selling at cost coal from three mines leased by the city. Within the first three days 1,300 tons were ordered by consumers and about a thousand families have availed themselves of mayor Speer's plan. Commissioner George A. Levy is at the head of the coal department and deliveries have been rapid. Four offices are in operation for the receipt of orders. Only those families of moderate means who would find difficulty in meeting the high prices of retailers are to be served at present and the price is \$4.15 a ton. The city has made contracts with operators of three lignite mines. The city has shipped machinery and other material necessary to the development of some of the mines in the northern fields, so that the output may be increased without further delay. These advances on the part of the administration are refunded beginning with the first carload of coal shipped from the mines, on a royalty basis, according to commissioner Levy. This will obviate the necessity for large financial investment and insure the rapid development of the mines, all of which are producing more than 100 tons a day at this time. All of the contracts for coal were entered into with independent miners, and the city has arranged to purchase the output at a stated figure a ton at the mine. The contract for delivery will relieve the city of establishing municipal yards at this time, and shift some of the responsibility of actually filling the orders to one. The provisions of the contracts, therefore, relieve the city from actually going into the business of mining at this time, or of actually delivering the coal with city teams, but give the consumer the advantage of obtaining coal at the actual cost price.

#### Evansville's Coal Yard in Action.

Evansville, Ind.—Mayor Bosse has opened a municipal coal yard near the C. & E. I. freight depot, where he will later sell coal from the recently leased municipal coal mine. Walter Korff of the waterworks is in charge. Orders are taken for delivery to consumers at 14½ cents, which figure is based on the price of \$2.20 at the mine, as set by President Wilson. Coal at this price will mean a saving of 75 cents on each fifty bushels, as the price charged by regular dealers is 16 cents. Mayor Bosse expects to have a supply of about 100 tons a day. The coal will all be first class and union-mined. It will be furnished by the C. & E. I. and the E. & I. railroads, coming from mines along their lines in the Evansville section, having been contracted for by the mayor in advance. The mayor declared he was not going to keep from getting coal cheap for the people, even though it may be his municipal mine will not be in operation this winter. Borings for the mine are about completed. The mine is located just above Chandler, Ind., 12 miles northwest of the city. The mayor is going to build it with his own money, then sell it to the city to be operated by the water works department. The mine will be sold to the city at cost 6 per cent interest on the original

investment. Just now the city cannot take over the mine, because its charter and the Indiana laws do not permit a city to operate its own coal mine. But Bosse declares he will fight for a new law to permit municipal operation of the mine. The legality of mayor Bosse's plan for the city to own and operate a coal mine will be left for the Public Service Commission of Indiana to decide. The mayor instructed city attorney John R. Brill to prepare a petition to the commission embodying all details of the proposed municipal mine. The layout of the mine has been inspected by state mine inspector Michael Scolland and his deputy, John Wright, and they gave it their approval, complimenting the mayor on his venture. The mine will produce 1,000 tons of coal a day. It will have the most modern equipment. Coal will be shipped to the city on a traction line and a railroad. Municipal coal yards will be established on each of these lines in Evansville. The coal will be sold at wholesale and retail at slightly above cost. The city will arrange to haul it to the house of the buyer.

#### Federal Food Administration Favors Municipal Markets.

Washington, D. C.—The Food Administration recently gave out the following announcement: "The committee representing the live-stock producers which has been sitting in Washington for some days, has formulated a series of recommendations to the Food Administration on the meat question. One of the principal recommendations in the report stated that the main hope of reducing the price of meats lies in the establishment of municipal markets, because the greatest expense in meat handling occurs with the retailer."

#### City to Build Summer Resort Cottages.

St. Louis, Mo.—The city will build cottages this winter on the banks of the Meramec River and establish a summer resort for people of small means who may lease the cottages for short periods at nominal rental, it was announced by director of public welfare John Schmoll. Director Schmoll has inspected the sixty-acre tract a mile below Valley Park which G. A. Buder, an attorney, presented to the city a year ago to be used for recreation purposes. The plot of ground is on the river, and will afford an excellent swimming beach, director Schmoll said, after a deposit of about 2 feet of mud is removed. It is about sixteen miles from the city, on the Frisco and Missouri Pacific railroads, and can be reached in about forty-five minutes for a fare of 12 cents if commuter tickets are purchased.

#### New Housing Law in Effect.

Lansing, Mich.—All cities of over 10,000 population in the state are affected by Michigan's new housing code which recently went into operation. The law was passed at the last session of the legislature. It is the aim of the new law to eliminate fire hazards and to improve sanitary conditions. It is now unlawful for a person to erect a building of more than three stories without using fireproof materials. All apartment or tenement houses more than one story high must have at least two independent ways of egress, extending from the ground floor to the roof. They must also have fire escapes from each story if more than one story high. Flat roof apartments of more than two stories must have in the roof a scuttle or bulkhead of not less than two by three feet in size. In multiple dwellings of three or more stories there must be at least one flight of stairs extending from the main floor to the roof, and the stairs and public hallways must be at least three feet wide and clear of obstruction. Furthermore, all stair halls must be enclosed on all sides with walls of brick not less than 8 inches thick. Dumb waiters and elevators in all multiple dwellings must be enclosed in fireproof shafting. Inside cellar stairs must be enclosed in fireproof walls and must have fireproof selfclosing doors at the base. It will be unlawful to erect a wooden multiple building of more than two stories in height and no more than two families can live above the first floor. No existing wooden buildings can be altered to provide for more than two families above the first floor. No dwelling can be altered in such a way that its light or ventilation would be reduced without approval of health officers.

## NEWS OF THE SOCIETIES

### Calendar of Meetings.

**Oct. 10.**—UNION OF BRITISH COLUMBIA MUNICIPALITIES. Annual convention. Duncan, B. C. Secretary, Ex-Reeve H. Bose, Survey Center, B. C.

**Oct. 15-17.**—NATIONAL HOUSING ASSOCIATION. Annual conference, Hotel La Salle, Chicago, Ill. Secretary, Lawrence Veiller, 105 East 22d St., New York City.

**Oct. 15-17.**—NATIONAL ASSOCIATION FOR STUDY AND PREVENTION OF INFANT MORTALITY. Annual meeting, Richmond, Va. Secretary, Gertrude B. Knipp, 1211 Cathedral street, Baltimore, Md.

**Oct. 16-19.**—LEAGUE OF KANSAS MUNICIPALITIES. Annual convention, Wichita, Kan. Secretary, Homer Talbot, University of Kansas, Lawrence, Kan.

**Oct. 17-18.**—LEAGUE OF MINNESOTA MUNICIPALITIES. Fifth annual convention, St. Cloud, Minn. Secretary-treasurer, Richard R. Price, University of Minnesota, Minneapolis.

**Oct. 17-19.**—AMERICAN PUBLIC HEALTH ASSOCIATION. Annual meeting, Washington, D. C. Acting Secretary, A. W. Hedrick, 126 Massachusetts Avenue, Boston, Mass.

**Oct. 22-24.**—AMERICAN CIVIC ASSOCIATION. Annual meeting, St. Louis, Mo. Secretary, Richard B. Watrous, 914 Union Trust building, Washington, D. C.

**Oct. 23-30.**—TEXAS CONFERENCE ON SOCIAL WELFARE. Annual convention, Austin, Texas.

**Nov. 19-24.**—CITY MANAGERS' ASSOCIATION. Annual meeting, Detroit, Mich. Secretary, W. L. Miller, City Manager, St. Augustine, Fla.

**Nov. 20-21.**—ASSOCIATION OF GOVERNMENTAL RESEARCH AGENCIES. Third annual meeting, Detroit, Mich. Secretary, C. O. Dustin, Statistical Bureau, Red Cross War Council, Washington, D. C.

**Nov. 20-23.**—PLAYGROUND AND RECREATION ASSOCIATION OF AMERICA. Recreation Congress. Secretary, H. S. Braucher, 1 Madison Ave., New York, N. Y.

**Nov. 21-24.**—NATIONAL MUNICIPAL LEAGUE. Twenty-third annual meeting, Hotel Statler, Detroit, Mich. Secretary, Clinton Rogers Woodruff, 703 North American Bldg., Philadelphia, Pa.

**Jan. 15-17.**—VIRGINIA GOOD ROADS ASSOCIATION. Seventh annual convention, Richmond, Va. Secretary, C. B. Scott, Richmond, Va.

**Feb. 6-13.**—FIRST CHICAGO CEMENT MACHINERY AND BUILDING SHOW. Supersedes annual Chicago Cement Show. Held at the Coliseum, under direction of the National Exhibition Co.

**March 17-24.**—PAN-AMERICAN CONGRESS ON CHILD WELFARE, Montevideo, Uruguay. Secretary, Edward N. Clopper, 105 East 22d Street, New York, N. Y.

### National Housing Association.

The Sixth National Housing Conference is to be held at Chicago October 15 to 17. The headquarters of the conference will be at the Hotel La Salle, where all of the meetings will be held. The conference will be under the auspices of a number of civic and social service organizations of the city. Some of the features of the preliminary program are given here.

Following registration and the official opening and addresses of welcome, there will be presented a brief report by the secretary, Lawrence Veiller. A round-table luncheon will be held in the Grand Ballroom, at which will be heard three-minute reports of progress of the year from the delegates. At the afternoon session the topics to be treated will be, "The Real Estate Men and Housing," by Fred G. Smith, chair-

man housing committee, National Association of Real Estate Boards of Minneapolis; and "How Can We Cheapen the Workingman's Dwelling?"

At 8 p. m. the subjects to be discussed will include: "Industrial Housing; What Employers Have Done to House Their Employees in the United States," by Leifer Magnusson, special agent United States Bureau of Labor Statistics; "Housing as a Factor in Reducing Labor Turnover; How One City Grappled with Its Problem of Industrial Housing," by William H. Ham, manager of the Bridgeport Housing Company, Bridgeport, Conn.

On Tuesday morning, October 16, there will be held two section meetings. Section A, on "Construction," will discuss "The Best House for the Small Wage Earner," by Richard Henry Dana, Jr., of Murphy and Dana, architects, New York; and "What Is the Best Size Lot?" Section B, on "Health," will hear addresses on "What City Department Shall Enforce Housing Laws—the Health Department or the Building Department?" by James F. McCrudden, chief division of housing and sanitation, health department, Philadelphia, Pa.; and "Organizing the Work of a Health Department—What One City Has Done: Detroit," by Henry F. Vaughan, assistant health officer, Detroit.

After luncheon there will be a discussion of "Chicago's Housing Problems." At 2.30 p. m. there will be an automobile trip through the city, showing recreation and small park systems and housing conditions.

At 8 p. m. there will be a session on the question of "The Housing of the Single Worker," at which the following subjects will be taken up: "Bunk Houses, Boarding Houses and Labor Camps," by W. B. Engelkraut, camp inspector of the Pennsylvania Railroad; "The Housing of the New Army," and "City Hotels for Workingmen."

On Wednesday morning the two sections on construction and health will again meet. At the former will be taken up "The Harm Done by Inflated and Speculative Building" and "Ready-Made Houses," by John E. Conzelman, Unit Construction Company, St. Louis. At the health section meeting will be discussed "The Modern Science of Ventilation as Applied to Dwellings," by E. V. Hill, M. D., of the Chicago health department; and "Wall Beds—Shall They Be Suppressed or Regulated?"

Luncheon will be held with the Chicago Association of Commerce. "The Zoning of Cities" will be the subject of addresses by Lawson Purdy, president board of taxes and assessments, New York, N. Y., and Thomas Adams, commissioner of Conservation, Ottawa, Canada.

At the afternoon session at 3 p. m. the subjects to be discussed will in-

clude "Organizing the Housing Work of a Community" and "The After-Care of a Housing Law," by Mrs. Albion Fellows Bacon, Evansville, Ind.

The evening session will begin with a banquet in the Grand Ballroom. "Housing and Industry" and "Housing and Education" will be the subject of addresses by speakers to be announced later.

The secretary and director of the association is Lawrence Veiller, 105 East 22d street, New York, N. Y.

### Southern Appalachian Good Roads Association.

Henry Roberts, president of the Southern Appalachian Good Roads Association, is now perfecting the program for the ninth annual convention of this association, which will be held in Nashville, Tenn., October 16, 17, 18 and 19.

At the convention next month President Roberts will advocate a plan for the taking over of the main arteries of travel in the several states by the state governments, these roads to be maintained out of state funds. A bill has already been drafted to put this plan into effect in Virginia, with practical assurance that the same will be done during the session of the next legislature. Mr. Roberts will urge all other states in the jurisdiction of the association to adopt a similar plan. The proposed legislative act to provide for this will provide that roads proposed for state ownership must be brought to a definite standard in all the counties through which they run. This will have the effect to stimulate the various counties in completing unfinished links and improving the state highways proposed for state ownership, as such roads will not be accepted except in conformity to the standard required.

The convention will open with a welcome address by Governor Thomas Rye on the evening of October 16. Henry Roberts, president of the association, will make response to the welcome.

Among the subjects to receive attention of highway engineers and authorities of the south and the federal government at this convention will be national and military highways; federal and state aid; maintenance; convict labor; road financing; concrete, brick and bituminous roads; closer co-operation between states in highway plans, and standardization of highway work.

Among the speakers will be John Craft, of Mobile, president of the Alabama Good Roads Association, whose subject will be National Military Highways; A. D. Williams, of Charleston, chairman of the State Road Commission of West Virginia, who will discuss Co-operation and Standardization. Other speakers on the various subjects will be C. B. Scott of Richmond, assistant highway commissioner of Virginia; W. S. Keller of Montgomery, state highway engineer of Alabama; X. A. Kramer of Jackson,



state highway commissioner of Mississippi; J. C. Batchelder of the American Automobile Association, Washington, D. C.; Rodman Wiley of Frankfort, state commissioner of public roads in Kentucky; A. M. Nelson, state highway engineer of Tennessee; J. J. Murray, secretary of state highway department of Tennessee; Judge Arthur Crownover of Winchester, chairman of the Tennessee highway commission, and Tom Rye, governor of Tennessee.

#### Washington County Commissioners and Engineers

Seattle was unanimously chosen as the next convention city of the county commissioners and engineers by the 1917 convention, in session in Spokane, Sept. 6-8. The commissioners of the counties will be guests of Seattle for the first time in August, 1918.

"Washington now ranks third in the roster of the states in importance of its highways," said Chairman Claude C. Ramsay, of the King county board of county commissioners, upon his return Saturday from the convention in Spokane. "Washington has spent \$50,000,000 in road construction in the last twenty years. This expenditure and the roads which have resulted from it have put us in third place."

Responses to the address of welcome were made for the commissioners by W. S. Coe, secretary-treasurer of the commissioners' association, and J. D. Neville, president of the engineers.

Dr. A. E. Stuht, Spokane county physician took the liberty of changing the subject assigned slightly in rendering his paper, to describe the results secured at the Edgecliff county tuberculosis sanitarium, instead of discussing proposed state control for the institution in the state.

George F. Cotterill, chief highway engineer, also delivered an address upon state highway policy, following which the two divisions separated. Engineers listened to technical discussions by H. J. Doolittle and Professor M. K. Snyder upon engineering problems.

#### Cambria County Good Roads Association.

Another indication that business men in close touch with conditions do not regard the war as an excuse or a reason for the false economic policy of holding up improvements is given in the action of the Cambria County (Pa.) Good Roads Association, an organization representing the interests of every section of the county. The association recently passed resolutions advocating the immediate building of a 60-mile permanent road system of brick or concrete, tapping every populous section of the county.

The resolutions outline the road system, advocate a bond issue of \$1,500,000 to cover the county's share of the cost, and urge that the work of making preliminary surveys be started immediately and actual construction next spring. The county commissioners have pledged themselves to make the surveys as soon as petitions are in from the supervisors of the various townships affected.

#### Northwest Electric Light and Power Association.

About 200 electric light and power men of western and northwestern states and British Columbia attended the tenth annual convention of the Northwest Electric Light and Power Association, held at Spokane, September 12 and 15. The visitors were welcomed by C. M. Fassett, city commissioner of public utilities, and M. C. Osborn, of Spokane, president of the association, responded.

Measures for national defense and a study of the safety code of the federal bureau of standards were advanced in the report of hydro-electric and technical committee as most important for the consideration of electrical engineers. The report was submitted by J. C. Martin, of Portland. J. E. Woodbridge, engineer for the Pacific Coast division of the National Electric Light Association, representing the California delegates, indorsed the report of the committee.

A technical paper by J. C. Ralston, of Spokane, and a discussion by Lewis A. McArthur, of Portland, were included in the program.

## PERSONALS

Alvord, John W., C.E., of the firm of Alvord & Burdick, consulting engineers, Chicago, has been appointed by Governor Lowden, of Illinois, as a member of the Illinois State Board of Natural Resources and Conservation. Other members of the board are: Prof. Thomas C. Chamberlain (geology), Prof. John M. Coulter (biology) (both of the University of Chicago), Prof. William A. Noyes (chemistry), Prof. William Trelease (forestry) (both of the University of Illinois). Mr. Alvord is to advise on water resources. President Edmund J. James, of the University of Illinois, is ex-officio member and chairman of the board. The board is appointed under the new Civil Administrative Act, and is expected to study the resources of the state, the work of its departments under the lines indicated, and advise the Governor and the Legislature from time to time on matters in which the welfare of the state may be promoted. The members of the board serve without compensation.

Board, Pat C., city manager of Charleston, W. Va., has resigned on account of private work, and has been succeeded by M. J. McChesney, city engineer.

Carnine, W. A., has been appointed highway commissioner of Polk County, Nebraska.

Francisco, E. O., who was assistant professor of civil engineering at the Agricultural and Mechanical College of Texas during the last session, has been commissioned a second lieutenant in the Engineer Officers' Reserve Corp and has been ordered to Ft. Leavenworth.

Greer, J. W., of Beeville, has been elected city manager of Bryan, Tex., succeeding W. Pipperman, who resigned to enter the officers' training camp at Leon Springs.

Powell, W. J., assistant city engineer of Dallas, Texas, has been appointed a captain in the Engineer Reserve Corps.

Shuey, Arthur F., has been appointed superintendent of the Tampa, Fla., waterworks.

Vorse, C. S., of Des Moines, has been appointed assistant to the county engineer of Pottawattamie County, Iowa.

## PROBLEMS CITIES ARE STUDYING WITH EXPERTS

Parsons, Pa., is making some STREET IMPROVEMENTS. The engineers for this work were Paxon & Morgan.

A SEWAGE DISPOSAL PLANT to cost \$40,000 is to be built by Cardington, Pa., plans and specifications being prepared by A. F. Damon.

In making some SEWERAGE IMPROVEMENTS, Hillsboro, Ill., has had the consulting engineering services of the Warren Engineering Company.

Clarke County, Athens, Ga., is to make DRAINAGE IMPROVEMENTS. The engineer for the work is W. D. Alexander.

Cuyahoga Falls, O., is extending its SEWERAGE SYSTEM. The engineer consulted for the work was R. Winthrop Pratt.

A WATER SUPPLY dam is proposed for Electra, Tex. The city has retained to investigate and report on the project Henry Exall Elrod.

In making PAVING IMPROVEMENTS, the borough of Hughestown, Pa., consulted E. H. Coward.

Millstadt, Ill., is to build a municipal ELECTRIC LIGHT PLANT. The Fuller-Coult Engineering Company has been consulted on this proposal.

Wabasha, Minn., is to extend its SEWERAGE SYSTEM according to plans and specifications prepared by J. F. Druar.

In making a number of SEWERAGE IMPROVEMENTS, Antioch, Ill., has had the consulting engineering services of H. L. Emerson.

The Belvue, Kan., drainage district, in making DRAINAGE EXTENSIONS, has the engineering services of V. R. Parkhurst.

SEWER IMPROVEMENTS are to be made by Fayette City, Pa. Plans and specifications for the work were made by the South Penn Engineering Company.

# NEW APPLIANCES

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations.

## G M C SAMSON TRACTOR.

### With Sieve Grip Wheels and Other Valuable Features.

One of the outstanding features of design and construction which has made for the successful operation of the G M C Samson tractor is the sieve grip wheel. This is clearly shown in the accompanying illustration. This type of design, used on all the three wheels, makes the tractor easy to handle on all kinds of roads and soils, and should therefore prove especially effective in road work.

The motor of the tractor is four-cylinder, four-cycle, with tractor type "L" head cylinders, cast en bloc. The cylinder heads are removable. Bore is  $4\frac{1}{4}$  inches, stroke  $6\frac{3}{4}$ . The crank shaft is of drop forged chrome nickel steel, heat treated and specially balanced. There are three large bronze backed babbbitted bearings. The connecting rod bearings are bronze and babbitt. The cam shaft is one-piece drop forged steel, heat treated. There are three liberal bearings of cast bronze.

The fuel system is gravity feed from cylindrical tank of terne plate, with capacity of 24 gallons. The carburetor is Marvel "E"  $1\frac{1}{4}$  inch. The air intake is through a patented cleansing device, eliminating danger of dust and grit entering motor. Ignition is by Eiseman G-4 waterproof, high tension, fixed spark magnetos.

Lubrication is by combination force and splash system. The cooling system consists of radiator, centrifugal water pump and fan. The radiator is built up with upper and lower tanks and vertical side members of semi-steel—vertical tube fin core. The capacity of the system is 10 gallons. The 19-inch, four-blade fan is driven by a  $2\frac{1}{2}$ -inch flat leather belt.

The clutch is of the internal expand-

ing type, operated by hand lever, giving positive action. Speeds are one forward and one reverse, controlled by hand lever. Gears are in constant mesh. The speeds range from  $1\frac{1}{2}$  to  $3\frac{1}{2}$  miles per hour—at 924 r. p. m. of the motor the tractor speed is  $2\frac{1}{4}$  miles an hour. The brakes are of the external contracting type, operated by foot pedal, with brake located on jack shaft. Steering gear is worm and sector type, operated by 15-inch hand wheel.

The frame is of channel steel, reinforced; reinforcements and draw bar angles are hot riveted. The front wheel is 28 inches in diameter, 15 inches wide, with guide rein in center of tread; sieve grip; roller bearings. The rear wheels are 40 inches in diameter, 18 inches wide; sieve grip; roller bearings.

The rating is 25 brake hp., at 650 r. p. m. The over-all length is 160 inches; over-all width,  $64\frac{1}{2}$  inches; over-all height, 56 inches, and weight, 5,200 pounds.

The G M C Sampson tractor is now a product of the General Motors Truck Company, Pontiac, Mich.

## FIRING DOOR.

### Cokal Device for Fuel Economy and Smoke Prevention.

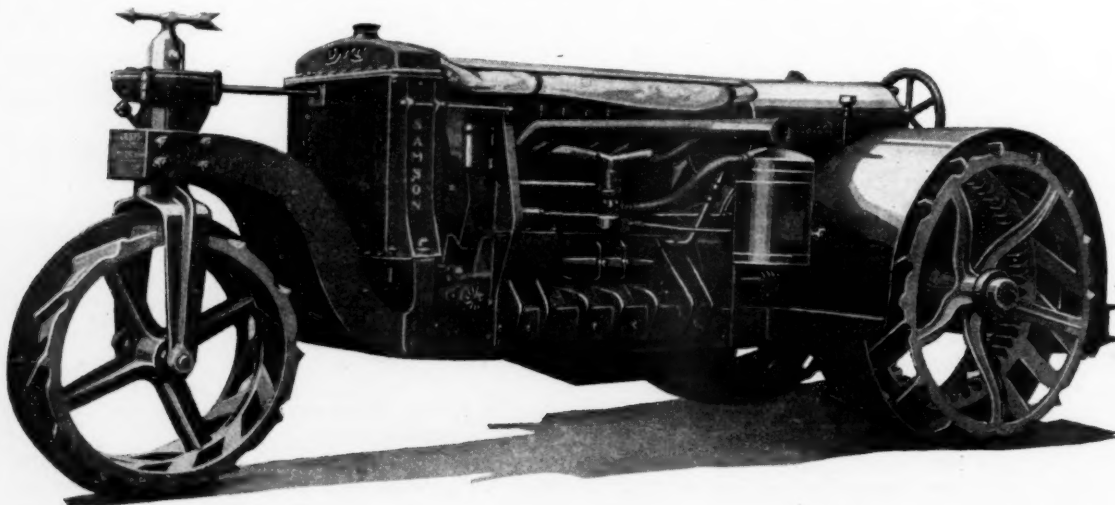
In these days of our exorbitant-priced and unreliable fuel supply and the conservation movement, municipal power plants and waterworks are making many improvements which will reduce their fuel costs. The elimination of smoke is also becoming an important problem in many cities. For these two purposes of economy and smokeless operation the Cokal firing door for furnaces has been developed.

The principle aimed at in the use of the device is that of complete combus-

tion. The coking method, which is recommended by the United States Bureau of Mines, is employed rather than the usual spreading method. The coal is first coked so that coke and gas are burned rather than "raw" coal. The heat ordinarily lost by radiation through the fire door is utilized in driving gas from coal, thus preparing it for complete combustion. The prevention of smoke is thus more easily accomplished.

The Cokal door is pivoted at the bottom. In order to feed coal (to be coked) it is only necessary to turn the crank and lower or tilt the cokal door enough to allow the coal in the hopper to fall into the V space between coal being coked and the front of the door. Turning the crank in the opposite direction forces the coal into the furnace and breaks the coal already coked. Heat in the furnace drives gas from the coal at the furnace front slowly, or rather in direct proportion to the intensity of the heat in the furnace. This process of distillation continues so long as any gas remains in the coal placed in the front of the furnace and so long as there is heat. After the gas has been driven from the coal the coke may be pushed to the back of the grate in order to maintain a very hot fire at that point. More coal is admitted to the furnace by means of the Cokal firing door and the volatile matter driven off must necessarily pass over the incandescent coke bed and be consumed.

A number of advantages are thus claimed for the Cokal door. Coal is fed into the furnace without the usual loss due to open fire doors, and there is no harmful in-rush of cold air. Coal is dried in the hopper so that the moisture, which would otherwise use up valuable furnace heat, is easily and economically eliminated. The door



G M C  
SAMSON  
TRACTOR  
(Showing  
Motor  
and  
Sieve Grip  
Wheel  
Construction)



may be used to advantage with undergrate boilers, and the steaming capacity of boilers is greatly increased. The combination of Cokal firing doors with forced draft (with or without damper regulation) is claimed to act as an ideal hand-operated stoker, with results similar to those obtained from the more expensive mechanically operated stokers. The Cokal door can be lowered to horizontal position for cleaning fires.

The cut on the next page shows the Cokal firing door attached to the fire box boiler in position for cleaning fires, and the drawing shows a sectional view while the coal is being pushed in. In normal position the door is all the way towards the furnace, and before firing all the way front, so that the V space is filled with coal from the hopper. The Cokal door is made by the Economy Furnace Appliance Co., 38-52 West Division Street, Chicago, Ill.

## INDUSTRIAL NEWS

**Cast-Iron Pipe.**—It is expected that the recent price regulation of iron ore, pig and finished products will have an effect of lowering prices very soon. Prices, however, still remain at their former high level. Quotations: Chicago, 4-inch Class B and heavier, \$68.50; 6-inch, \$65.50. New York, 4-inch, Class B and heavier, \$68.50; 6-inch, \$65.50. Birmingham, 4-inch, Class B and heavier, \$63; 6-inch, \$60; Class A, \$1 extra.

**The Badger Meter Manufacturing Company,** Milwaukee, Wis., has been awarded the contract for furnishing the water department of Kansas City, Mo., with five thousand water meters.

**Sloan, Huddle, Feustel & Freeman,** consulting engineers, Boston and Chicago, have removed their general offices at Madison, Wis., and their Chicago office in the People's Gas Building, to the Conway Building, Chicago. Mr. William F. Sloan has per-

sonal charge of the Boston office, which is located at 14 Kilby street, Boston, Mass.

### Regulation of Iron and Steel Prices.

The President has approved an agreement between the war industries board and the steel men, fixing the following prices, which become effective immediately, and are subject to revision January 1, 1918, as follows:

Commodity	Basis	Price agreed upon	Recent price	Reduction	
				Amount	Per cent.
Iron ore	Lower Lake ports	\$5.05	\$5.05		
Coke	Connellsville	\$6.00	\$16.00	\$10.00	62.5
Pig Iron		\$33.00	\$58.00	25.00	43.1
Steel bars	Pittsburgh	\$2.90	\$5.50	2.60	47.3
	Chicago				
Shapes	Pittsburgh	\$3.00	\$6.00	3.00	50.0
	Chicago				
Plates	Pittsburgh	\$3.25	\$11.00	7.75	70.5
	Chicago				

<sup>1</sup>Gross tons; <sup>2</sup>Net tons; <sup>3</sup>Hundredweight.

It was stipulated, first, that there should be no reduction in the present rate of wages; second, that the prices above named should be made to the public and to the allies, as well as to the Government, and third, that the steel men pledge themselves to exert every effort necessary to keep up the production to the maximum of the past so long as the war lasts.

Measures will be taken by the war industries board for placing orders and supervising the output of the steel mills in such manner as to facilitate and expedite the requirements of the Government and its allies for war purposes, and to supply the needs of the public according to their public importance and in the best interest of all, as far as practicable.

**The Standard Asphalt and Refining Co.,** Chicago, Ill., has purchased the plants, trade-marks and good-will of the **Sarco Petroleum Products Co.** The Cities Service Company of 60 Wall Street, New York City, is the new interest back of this company, although the management remains

essentially the same as before the change. Mr. Charles Muller, who was an executive of the former company, now becomes manager. He has been associated with the old company for ten years, and has risen through the ranks to his present position and is well known in business and financial circles in Chicago. Mr. Robert F. Trumbull has been promoted to be manager of the Railway and Building Materials Department. He has been

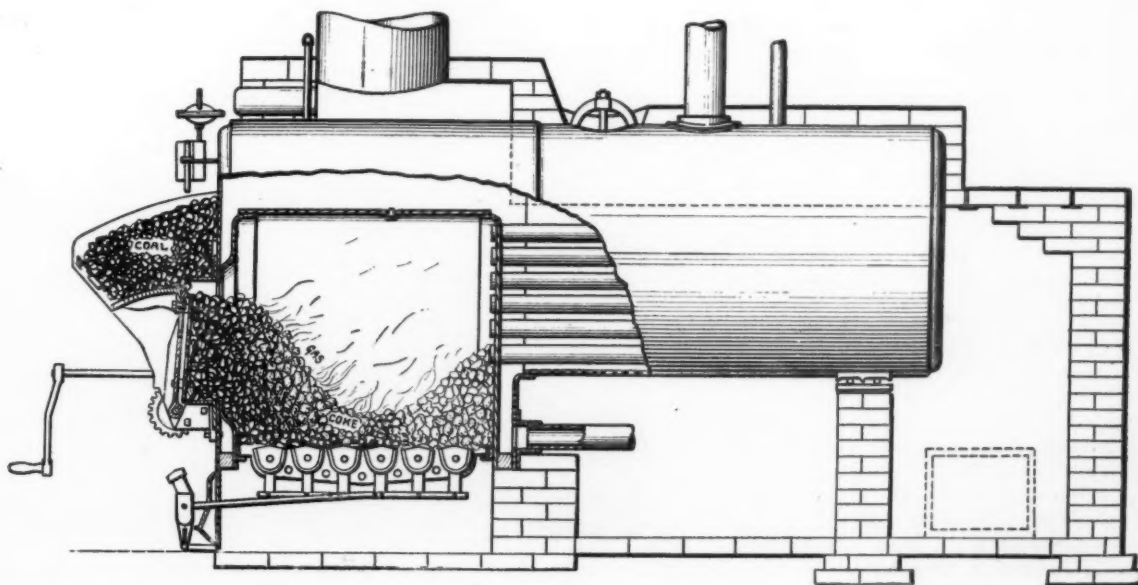
in the service of the old company for eight years in this department. The indications are that the new company will be much more active than the old, and that its facilities for serving the trade will be greatly increased, due to the extensive control of crude materials possessed by the Cities Service Company.

### Priority in Iron and Steel Orders.

The priorities committee of the war industries board, of the Council of National Defense has made public the contents of its first general priority circular, giving instructions as to priority in orders and work for all individuals, firms, associations and corporations engaged in the production of iron and steel and in the manufacture of products thereof. About 25,000 copies of the circular have been sent to manufacturers in all parts of the United States, requesting them hereafter to observe the regulations, giving priority in accordance with certificates to be issued by the committee. The circular is signed by Judge Robert S. Lovett, chairman, and

SECTIONAL  
VIEW OF  
COKAL  
FIRING  
DOOR

(Coal is being  
pushed into  
furnace).



is approved by the Secretaries of War and the Navy.

Under these regulations all orders and work are divided into three classes: Class A, comprising "war work"; that is to say, orders and work urgently necessary in carrying on the war, such as arms, ammunition, ships, etc., and the materials required in their manufacture"; Class B, comprising orders and work "which, while not primarily designed for the prosecution of the war, yet are of public interest and essential to the national welfare, or otherwise of exceptional importance"; Class C, comprising all orders and work not embraced in Class A or Class B. All orders henceforth will be classed as Class C unless covered by certificates of the priorities committee. No certificates will be issued for Class C orders.

Orders and work in Class A will take precedence over those in Class B, and both these classes will be given priority over Class C, irrespective of the date the orders were received. Class A and Class B will in turn be separated into subdivisions to be designated as Class A1, A2, A3, A4, etc., and Class B1, B2, B3, B4, etc., each composed of orders within the class which are regarded respectively as of greater moment and to be given precedence in accordance with its serial number. All materials required in the manufacture of an article or in prosecution of any work will be entitled to take the class of such article or work unless otherwise specified.

For the administration of the regulations certificates will be issued by the priorities committee upon application specifying the classification of the order of work. Certificates of a subsidiary nature will be issued upon request for the furnishing of material and articles required in manufacturing the article or prosecuting the work ordered.

Applications for Class A certificates will be made to the committee by the contracting officer or agency of the United States, or, in the case of the Allies, by their authorized agent. Applications for subsidiary certificates covering materials, articles, or work required in the manufacture of Class A products will be made by the contractor to whom the principal Class A certificate has been addressed.

Applications for Class B certificates will be made to the committee by the individual, firm, or corporation for the expedition of whose contract the priority order is desired; while subsidiary certificates for materials will, as in the case of Class A certificates, be applied for by the contractor to whom the principal Class B certificate has been addressed.

The priorities committee is composed of Robert S. Lovett, chairman; Major-General J. B. Aleshire, George Armsby, Rear-Admiral N. E. Mason, Edwin B. Parker, J. Leonard Replogle, and Rear-Admiral A. V. Zane. R. T. Demsey is executive secretary.

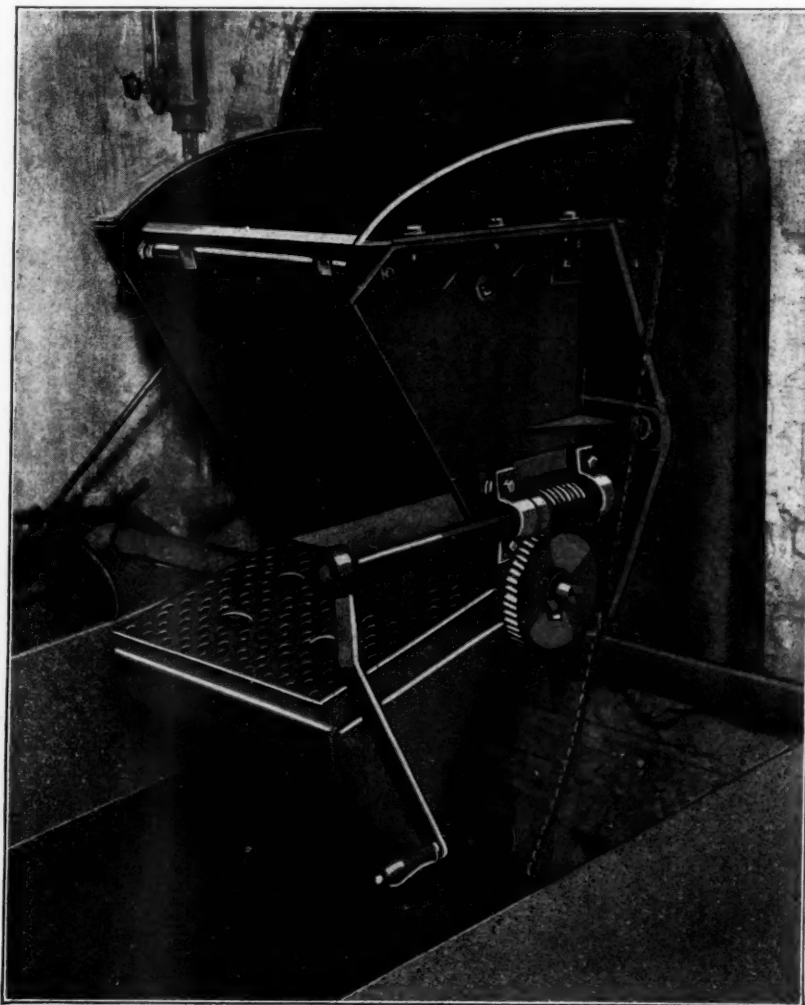
**Walter A. Zelnicker Supply Company**, 325 Locust Street, St. Louis, Mo., has just issued for general and immediate distribution a new catalog, Bulletin No. 220, entitled "Dollars at Work." This should prove of great value to contractors and city officials in the market now, or soon, for construction supplies. The catalog covers, among other things, rails, locomotives, steel piling, tanks, air compressors, hoists, boilers, cranes, pumps, generators, motors, steam shovels and machinery of all kinds.

#### Production of Lead.

The United States Geological Survey, Department of the Interior, has undertaken a midyear canvass of lead production, the results of which have just been tabulated by C. E. Sieben-thal. For convenience of comparison half the corresponding qualities for the 12 months of 1916 are inclosed in brackets. The output of domestic desilverized lead, excluding desilvered soft lead for the first six months of 1917, was 152,231 short tons (158,235), the output of domestic soft lead, including desilverized soft lead, was 124,292 tons (117,879) and the output of lead produced from foreign ores and bullion was 29,539 tons (9,453). In view of the

scarcity of lead, the increase in lead of foreign origin is very encouraging. The greater part came from Mexico. According to the records of the Bureau of Domestic and Foreign Commerce, the total lead imported in the first six months of 1917 was 30,620 tons (17,665) of which 22,507 tons came from Mexico (12,099), and 4,569 tons came from Canada (3,153). The exports of domestic lead amounted to 29,241 tons (50,283) and of foreign lead 6,066 tons (4,940). The lead used in articles exported with the benefit of drawback was 3,270 tons (2,585). Thus the total exports of lead were 38,577 tons (57,808). Disregarding stocks, the apparent consumption of lead in this country in the six months was 268,952 tons (230,587). The production of new antimonial lead was 7,822 tons (12,019), and of secondary antimonial lead 1,959 tons (2,065). The output of secondary pig lead by regular ore smelters was 7,578 tons (5,548). The average outside spot price of lead during the six months' period was 9.9 cents a pound, as against 6.9 cents in 1916.

**The Worthington Pump & Machinery Corporation**, 115 Broadway, New York, N. Y., has issued a new bulletin, No. W-600-A, which describes and illustrates the Worthington volute centrifugal pumps.



COKAL FIRING DOOR IN POSITION FOR CLEANING FIRES.